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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

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I.—NOTES ON SOME SPECIES OF ACALYPHA.

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The earliest effort to enumerate the South African species of this genus we owe to Thunberg, in whose *Prodr. Pl. Cap.*, part 2, p. 117 (1800), we find diagnoses of three species: *A. glabrata*, *A. decumbens*, and *A. cordata*. In the edition of Thunberg's *Flora Capensis*, published by Schultes (1823), we find at p. 545 descriptions as well as diagnoses of the same three species, with diagnoses and descriptions of two others, *A. acuta*, Thunb., and *A. obtusa*, Thunb., on p. 546.

When, however, we turn to Thunberg's herbarium, which, thanks to the kindness of Professor Juel, has been entrusted to us for study, we find that of the two species of *Tragia* diagnosed in *Prodr. Pl. Cap.*, part 1, p. 14 (1794), and described in the *Flora Capensis*, ed. Schultes, p. 37 (1823): one, *T. villosa*, is an *Acalypha*. We find, moreover, that in Thunberg's herbarium, the plant which he collected between Sunday River and Fish River, and which he has written up as *A. glabrata* with his own hand, is not the plant to which the diagnosis and description published by Schultes apply. It is a plant with opposite leaves, and is in reality the plant described as "*A. acuta*." On the other hand, this name *A. acuta* is that which Thunberg has himself written on the sheet of the woody species with alternate leaves, which has been described as *A. glabrata*.

The opposite-leaved species described as *A. acuta*, happens to be an *Adenocline* and does not further concern us; the other species, *A. obtusa*, described on p. 546, is a *Leidesia*, and so may also be put aside. But the two remaining species described on p. 545 as

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A. decumbens, Thunb., and *A. cordata*, Thunb., respectively, prove, from Thunberg's original specimen, to be merely forms of one species: the specimens in the same collection further demonstrate that *Tragia villosa*, Thunb., is merely a variety of the same species. Jacquin, in 1760, had already published his *Acalypha villosa*, so that the publication of *Tragia villosa* in 1794 does not necessitate the abandonment of the name *Acalypha decumbens*, published in 1800. But before dealing with it himself Thunberg gave a specimen of this plant to Linnaeus as his n. 326 and without a name, some time after the appearance of the second *Mantissa* in 1771. When placing this specimen in his collection Linnaeus wrote it up as *Urtica africana*, "T. 326." The description did not, however, appear until 1781 when it was published by the younger Linnaeus, who, when publishing, altered his father's manuscript name "U. africana" to *U. capensis*, Linn. f. Suppl. Pl. 417. The name *A. decumbens*, which dates from 1800, must therefore give place to *A. capensis*.

Briefly summarised, Thunberg has made known two South African species of *Acalypha*: (1) *A. glabrata*, as conventionally understood, though this name was really applied by Thunberg to a member of another genus, and (2) *A. capensis*, which Thunberg broke up into three species, and referred to two different genera.

No further addition was made to our knowledge of this genus in Africa until the appearance in 1843 of Drège's *Zwei pflanzengeographische Documente*. At p. 161 of this work the following twenty-three references to Acalypha are given:—(1) A. betulina, *Retz* a; (2) A. betulina, *Retz* b; (3) A. betulina, *Retz* c; (4) A. betulina, *Retz?*; (5) A. glabrata, *Thunb.*; (6) A. languida, *E. Mey.* a; (7) A languida, *E. Mey.* b; (8) A. languida, *E. Mey.* c; (9) A. brachiata, *a*, *E. Mey.* a; (10) A. brachiata, *a*, *E. Mey.* b; (11) A. brachiata, *β*, *E. Mey.*; (12) A. cordata, *Thunb.*; (13) A. cordata, *Thunb.?*; (14) A. discolor, *E. Mey.*; (15) A. peduncularis, *E. Mey.* a; (16) A. peduncularis, *E. Mey.* aa; (17) A. peduncularis, *E. Mey.* b; (18) A. peduncularis, *E. Mey.?*; (19) A. velutina, *E. Mey.*; (20) Acalypha, 4636; (21) Acalypha, 5380; (22) Acalypha, 8240; (23) ?Acalypha, 4610.

Of these twenty-three references two are duplicates, because No. 13, A. cordata, *Thunb.?*, and No. 18, A. peduncularis, *E. Mey.?*, indicate the same species, as also do No. 3, A. betulina, *Retz*, c, and No. 23, Acalypha, 4610. The plant which is at once the subject of references 13 and 18, is neither *A. cordata* nor *A. peduncularis*; it is, however, the same as the subjects of the references 9, 10 and 11, *A. brachiata*, E. Mey., a distinct species different from either of those enumerated by Thunberg. To the same species belongs No. 12, "A. cordata," which, again, is not the species so named by Thunberg.

No. 5 of the list, "A. glabrata," is really A. glabrata, *Thunb.*, and to the same species belongs No. 4, "A. betulina?," which is not *A. betulina*, Retz (A. fruticosa, *Forsk.*), as also does *Acalypha*, 4636 (No. 20). The three gatherings named *A. betulina*, Retz (Nos. 1, 2 and 3), are shown by the specimens not to be that species, but to be forms or varieties of *A. glabrata*, usually with leaves broader than in the type; two of them, b and c, have glabrous

leaves, the remaining one, a, has velvety leaves, and is identical with No. 19, A. velutina, *E. Mey.*, which is therefore also referable to *A. glabrata*; the one marked b, however, includes some specimens which are not distinguishable from typical *A. glabrata*, Thunb.

To the second Thunbergian species belong 14, A. discolor, *E. Mey.*, and 22, *Acalypha*, 8240, both of which are *A. capensis*.

Of the remainder, Nos. 6, 7 and 8 represent a distinct species, *A. languida*; Nos. 15, 16 and 17, another distinct species, *A. peduncularis*; while No. 21, *Acalypha*, 5380, represents yet another species for which, in Hb. Lübeck, Meyer proposed the name "A. longifolia."

Briefly summarised, we find then that Drège had repeated both of Thunberg's species :—

1. A. capensis, under references 14, 22, and
2. A. glabrata, *Thunb.*, under references 2 (in part), 4, 5, 20, 23, with the addition, as species, of two varieties of *A. glabrata*, viz. :—
   betulina, *E. Mey.*, *non Retz*, under references 2 (in part), 3, and
   velutina, *E. Mey.*, under references 1, 19.

But in addition to these two species Drège has added four more :—

3. A. languida, *E. Mey.*, under references 6, 7, 8.
4. A. brachiata, *E. Mey.*, under references 9, 10, 11, 12, 13.
5. A. peduncularis, *E. Mey.*, under references 15, 16, 17.
6. A longifolia, *E. Mey.*, under reference 21.

Unfortunately, these four species were not properly published in 1843, and the last of the list, *A. longifolia*, was not even named in Drège's *Zwei pflanzengeographische Documente*. Owing to this circumstance, although all the four species recognised by Meyer are valid, only one of his names has been maintained.

In 1845, Krauss published in *Flora*, vol. xxviii., on pp. 82–84, an account of the species of *Acalypha* which he had collected in South Africa. In dealing with his material he appears to have had the assistance of Buchinger, who named some of his specimens, and of Meisner and Hochstetter, who described some of the species.

It is somewhat singular that among the specimens collected by Krauss there should be no example of A. glabrata, *Thunb.* His n. 1826, however, which was dealt with by Hochstetter, who identified it with *A. discolor*, E. Mey., and provided a description of the species, is the original *A. decumbens*, Thunb., a fact which neither Hochstetter nor Krauss appears to have detected. His n. 1825 was named by Buchinger *A. Kraussiana*. This name was taken up by Meisner, who provided a description for the plant. In so doing, Meisner appears to have overlooked the fact that *A. Kraussiana* is identical with *Tragia villosa*, Thunb., and had no means of knowing that it is identical with *Urtica capensis*, Linn. f.

Krauss collected, as his Nos. 319 and 367, two plants, one near Durban, the other near Maritzburg, which, in spite of their identity as regards external appearance, he referred to different species. One of the two, n. 319, was taken to be *A. brachiata*, E. Mey.; the other, n. 367, it was supposed might perhaps be *A. languida* E. Mey. The two are conspecific; neither is *A. brachiata*, E. Mey.,

which as it happens Krauss does not appear to have collected at all; both, however, are *A. languida*, E. Mey. Owing to his doubt as to this fact, Hochstetter thought it desirable to use for n. 367 a new name, *A. petiolaris*; as this name is accompanied by a description, whereas the older name, *A. languida*, had none, *A. petiolaris*, Hochst., is the name which is now employed to distinguish this species.

Under his field number 377, Krauss appears to have collected three nearly related but fairly easily distinguishable forms. One of these Meisner identified—we believe rightly so, though so great an authority as Müller was of a contrary opinion—with A. peduncularis, *E. Mey.* Of the other two, Buchinger regarded one as a distinct species, *A. crassa*; Meisner described the other as a third distinct species, *A. punctata.* Krauss, however, has remarked in a footnote upon the difficulty which he experienced in separating *A. crassa*, Buching., from *A. peduncularis.* With the view of Krauss we entirely agree, and we concur with Müller in his treatment of the plant as a variety, var. *crassa*, of *A. peduncularis.* But as regards *A. punctata*, Meisn., which is only a form of the species already recognised by Meyer under the name *A. longifolia*, we concur with Krauss in treating it as distinct, and feel unable to follow Müller in dealing with it as only a variety of *A. peduncularis.*

The last species dealt with by Krauss is one represented by specimens which he had collected without any field-number; to this Buchinger gave the name *A. glandulifolia* and in spite of the fact that Müller treated this plant as yet another variety of *A. peduncularis* there is probably no more valid species in the genus.

Briefly summarised the account given by Krauss deals with only one of Thunberg's species of *Acalypha*, *A. capensis*, and omits *A. glabrata.* The account equally omits one of the species, *A. brachiata*, enumerated by Drège; of the other three it retains only the name given by Meyer to *A. peduncularis*; the name of *A. languida*, E. Mey., is altered to *A. petiolaris*, Hochst., that of *A. longifolia*, E. Mey., is replaced by *A. punctata*, Meisn. The omission of *A. brachiata*, E. Mey., is compensated for by the communication of the very distinct *A. glandulifolia*, Buching.

Up to this point (1845) the South African species of *Acalypha* were known to be *A. glabrata*, Thunb.; *A. capensis*; *A. petiolaris*, Hochst. (= *A. languida*, E. Mey.); *A. brachiata*, E. Mey.; *A. peduncularis*, E. Mey.; *A. punctata*, Meisn. (= A. longifolia, *E. Mey.*) and finally *A. glandulifolia*, Buching.

In *Linnaea*, vol. xx. (1847), p. 213 there is a list of specimens of *Acalypha* collected by Zeyher in South Africa. The first of these, Zeyher 3838, is named *A. peduncularis*, E. Mey., and the specimens show that this identification is correct. The second, Zeyher 3839, which is unnamed, became at a later date the type of a new species described by Baillon. The third, Zeyher 1518, also unnamed, became subsequently, in part, the basis of a new species described by Sonder. The next number in the list, Zeyher 1517, is applied to the specimens of three gatherings and is treated as including two species. One of these, represented by Zeyher 1517a, is identified with *A. glabrata*, Thunb., the other, represented by Zeyher 1517b and 1517c is provisionally identified with *A. betulina*,

Retz. This limitation is substantially in accordance with the limitation of the same two Acalyphas by Meyer in 1843 ; the plant identified with *A. glabrata*, Thunb. is in reality that species while the one identified as *A. betulina* is not the plant so named by Retz but is a variety of *A. glabrata*. The last *Acalypha* in this list, Zeyher 3840, identified correctly as *A. discolor*, E. Mey., is, therefore, as we have seen, *A. capensis* (= *A. decumbens*, Thunb.).

This Zeyherian list, briefly summarised, therefore adds to the genus two additional South African species neither of which is provided with a name.

The next contribution to our knowledge of the South African species of *Acalypha* was published by Sonder in Linnaea, vol. xxiii. (1850), pp. 115–117. Through the kindness of Professor Lindman and Dr. Dahlstedt we have been enabled, in considering this enumeration, to examine the actual specimens with which Sonder dealt. We may discuss the six species he accounts for seriatim.

The first species recorded by Sonder is "A peduncularis, E. Mey.! Meisn.! syn. A. crassa, Buching!" for which he cites no specimen but to which he adds a variety "β. glabrata, Sond." based on a specimen collected by Zeyher on the Macalisberg Range. The only specimen in his herbarium on which Sonder has written the name "*A. peduncularis*, E. Mey." is one of Zeyher 3838, from Howison's Poort, Albany Div., which is exactly like the plant collected in the Assegai Bush, Albany Div. by Drège, and obtained by the same collector on two occasions on the Zuureberg Range, that forms the basis of *A. peduncularis*, E. Mey. It so happens that Sonder's statement that this plant is really conspecific with the Natal one described by Meisner under the same name, is accurate. But an examination of his specimens shows that the accuracy of Sonder in this regard is purely accidental, for he did not have at his command any example of any portion of Krauss, 377. The specimen which led Sonder to this conclusion is one collected by Gueinzius at Port Natal which was written up in Sonder's collection as "Acalypha peduncularis, E. Mey.?—crassa, Buch.!" Above this legend has been added subsequently the name "A. punctata, Meisn.?," a justifiable afterthought because this plant of Gueinzius does not agree either with the part of Krauss 377 which Meisner described as *A. peduncularis*, or with the part of Krauss 377 which Buchinger named *A. crassa*. It is, however, identical with the remaining portion of Krauss 377, which is the type of *A. punctata*, Meisn.

Nor has Sonder been really more fortunate in his treatment of his own variety 'glabrata.' It is true that the description given by Sonder applies only to one plant, and that this plant is a specimen of Zeyher 1521, from the Macalisberg Range, on which Sonder has written the name *A. peduncularis*, β. *glabrata*. But in his own herbarium Sonder wrote up a specimen of Zeyher 3839 also as *A. peduncularis*, β *glabrata* ; to this second specimen, which was collected on Van Staadensberg, Uitenhage Div., Sonder's description of var. *glabrata* is quite inapplicable.

Sonder's second species is one which he describes as new and is based on Gueinzius 171, from Natal and on Zeyher 1518, from the Macalisberg Range. This species, *A. angustata*, Sond., is perfectly

valid and the only modification that is required in his view consists of the inclusion of the proposed variety within the type.

Sonder's third species is *A. glandulifolia*, Buching., which we have already seen to be a valid species. Here again Sonder has suggested the recognition of two distinct forms; the advent of additional material indicates that this differentiation is not required.

The fourth species enumerated by Sonder is the one first issued by Drège in 1843 as *A. languida*, E. Mey., but first described by Hochstetter in 1845 as *A. petiolaris*. In giving preference to the synonym which, though the older, is merely a naked name, Sonder acted unfortunately.

The fifth species is that which Sonder has termed *A. betulina*, Retz. The species is now for the first time dealt with intelligibly and the true relationship of the two allied forms, whose existence had already been indicated by E. Meyer and by Ecklon and Zeyher, is more clearly defined. But the name employed is unfortunate; the species is not *A. betulina*, Retz, but is *A. glabrata*, Thunb. Fuller knowledge, moreover, indicates that there is no real necessity for the recognition of var. *latifolia* as apart from the type.

The sixth species, in spite of the doubt to which Sonder testifies, is really an *Acalypha* and is, as Sonder indicates, a distinct and valid species. But the use, in designating this new species, of the epithet which Sonder was aware Hochstetter had already applied to another *Acalypha* is singularly unfortunate. Our present conventions, which render incumbent the use of the name "A. petiolaris" in connection with the plant described as such by Hochstetter in 1845, prevent us from employing it to designate the plant so described by Sonder in 1850.

In Linnaea, vol. xxv. (1852), at p. 587, Scheele based on Drège, 8242, a species of *Acalypha* from South Africa, *A. lamiifolia*, Scheele. The plant on which this species was based is, however, identical with that to which Buchinger had already given the name *A. Kraussiana* and is hardly distinguishable from *Urtica capensis*, Linn. f. = *Tragia villosa*, Thunb., of which *A. decumbens*, Thunb. is at best only a variety.

Ten years later Baillon published in *Adansonia*, vol. iii. (1862), pp. 156–158 a resume of the South African species of *Acalypha*, based partly on specimens, partly on the literature which has been passed under review.

1. *Acalypha peduncularis*, Baill. is identical with *A. peduncularis*, E. Mey., the specimens of Masson and of Zeyher 3838 which are cited agreeing precisely with those of Drège on which the species was based. Baillon, however, had no opportunity of seeing any specimen of Krauss 377 and his erroneous reduction of *A. crassa*, Buching. to *A. peduncularis* is adopted from Sonder.

2. *Acalypha Zeyheri*, Baill., based on Zeyher 3839 and on a specimen of doubtful provenance bearing the number 301, supplies the earliest description of a valid species.

3. *Acalypha caperonioides*, Baill., based on Zeyher 1521 is again a valid species. In this instance Baillon has failed to note that the same plant is the type of *A. peduncularis*, β *glabrata*, Sond.

4. *Acalypha angustata*, Baill. is Sonder's species of this name.

5. *Acalypha glandulifolia*, Baill. is Buchinger's species of this name.

6. *Acalypha languida*, Baill. is E. Meyer's species of this name treated as it was treated by Sonder.

7. *Acalypha betulina*, Baill., to which Baillon only doubtfully refers Zeyher 1517a, the only specimen seen by him, is on this account *A. glabrata*, Thunb. proper.

8. *Acalypha discolor*, Baill. is *A. discolor*, E. Mey. treated as it was by Krauss and Hochstetter in 1845. To this Baillon has added a variety β major, *Baill.* which is, though Baillon was unaware of the fact, the same as *A. cordata*, Thunb.

9. *Acalypha lamiifolia*, Baill. is *A. lamiifolia*, Scheele, the identity of which with *A. Kraussiana*, Buching. Baillon has failed to notice. It is also almost identical with *Urtica capensis*, Linn. f. = *Tragia villosa*, Thunb., of which *A. decumbens*, Thunb., is only a variety.

10. *Acalypha brachiata*, Baill. is E. Meyer's species of this name.

11. *Acalypha Eckloni*, Baill., based on a gathering issued by E. Meyer as *A. cordata* ?, is identical with the preceding species. As the only description so far published was that here supplied by Baillon his name *A. Eckloni* supplants the earlier name *A. brachiata.*

Briefly summarised the resumé of Baillon of 1863 makes us aware of the existence of nine species, viz :—*A. glabrata* and *A. capensis* already known to Thunberg in 1800 ; *A. petiolaris*, *A. Eckloni* and *A. peduncularis* already known to E. Meyer (as A. languida, A. brachiata and A. peduncularis respectively) in 1843 ; *A. glandulifolia* already known to Krauss in 1845 ; *A. angustata* already known to Sonder in 1850 ; finally *A. Zeyheri* and *A. caperonioides* the existence of which had been indicated by Ecklon and Zeyher in 1847, now for the first time properly named and described. Baillon's resumé fails to account for *A. punctata*, Meisn. published by Krauss, or to observe that *A. lamiifolia*, Scheele is hardly more than a repetition of *A. Kraussiana*, Buching. also published by Krauss.

This resumé was followed in 1865 and 1866 by the preliminary and the finished monographs of the genus by Müller published in Linnaea, vol. xxxiv. (1865), pp. 1–54 and in De Candolle's Prodromus, vol. xv., pars ii. (1866), pp. 799–889 respectively. These two accounts we may conveniently consider together.

In the earlier account, Müller gives ten species as coming from South Africa. These are :—10, Sonderiana (Linnaea, vol. xxxiv., p. 9) ; 87, peduncularis (p. 28) ; 88, Zeyheri (p. 29) ; 89, petiolaris (p. 29) ; 90, languida (p. 29) ; 91, tenuis (p. 30) ; 92, Eckloni (p. 30) ; 98, glabrata (p. 36) ; 118, discolor (p. 38) ; 119, Kraussiana (p. 39).

In the fuller account of the following year, Müller enumerates eleven South African forms, adding two new species to the 1865 list and at the same time reducing two of those in the earlier list, *discolor* and *Kraussiana*, to the position of varieties of one species, *decumbens*. The 1866 list is as follows :—10, Sonderiana (DC. Prodr. xv., ii., p. 804) ; 59, grandidentata (p. 823) ; 116, peduncularis (p. 846) ; 117, Zeyheri (p. 847) ; 118, petiolaris (p. 847) ; 119, languida (p. 848) ; 120, tenuis (p. 848) ; 121, patens (p. 848) ; 122,

Eckloni (p. 849); 139, glabrata (p. 857), and 156, decumbens (p. 864). In addition to the foregoing, five of the species described by Müller in 1866, which were not at that time known to occur south of the Tropic, have since that date been gathered in South Africa. These are:—85, ornata (p. 833); 115, senensis (p. 845), from which 114, zambesica, is not distinguishable; 165, indica (p. 868); 175, ciliata (p. 873), and 183, segetalis (p. 877).

No remark is called for in the case of any of these five species, nor is any remark called for in the case of 10, Sonderiana, *Müll. Arg.* (1865), which is *A. petiolaris*, Sond. (1850), not of Hochst. (1845), and is a valid species.

Little remark is required in the case of 139, *glabrata*, Thunb. (1800), which is the plant described in Schultes' edition of Thunberg's *Flora Capensis* (1823), and on this account is a valid species notwithstanding the fact that it is not based on the specimen cited in that work, and is not the plant named *A. glabrata* in Thunberg's own herbarium. In his acceptance of the variety *latifolia*, Müller has merely followed Sonder. Another valid species is 156, *decumbens*, Thunb. (1800), now *A. capensis*, which is identical with *A. discolor*, E. Mey. ex Meisn. (1845), and includes *Urtica capensis*, Linn. f. (1781), *Tragia villosa*, Thunb. (1794), *A. cordata*, Thunb. (1800), *A. Kraussiana*, Buching. (1845), *A. lamiifolia*, Scheele (1852), and *A. discolor*, β *major*, Baill. (1862). But 59, *grandidentata*, Müll. Arg. (1866), is identical with *Tragia villosa*, Thunb., and therefore is not a valid species. Owing to Müller having failed to observe that *Urtica capensis*, Linn. f. (1781) and *Tragia villosa*, Thunb. (1794) are the same plant, he has omitted to employ for the species as a whole the name "Acalypha capensis." Another valid species is 122, *Eckloni*, Baill. (1863), which includes *A. brachiata*, E. Mey. In 1862 Baillon had himself actually accepted this name which Meyer had proposed in 1843. But in so doing, Baillon, like Meyer himself, failed to prepare a description; as a consequence, the conventions of nomenclature insist that the name *A. Eckloni*, though the accident of a misconception, shall be used for Meyer's plant.

Another quite valid species is 118, *petiolaris*, Hochst. (1845), the name used for which similarly supplants the name *A. languida* proposed by Meyer two years earlier. In this instance, however, Müller has made an effort to maintain *A. languida*, E. Mey., as a species. His justification for this is the belief that a specimen in Herb. Berlin, which Meyer has written up as *A. languida*, differs specifically from the other specimens so named, and therefore from *A. petiolaris*, Hochst. This view cannot be sustained. There is no specimen in Herb. Berlin named *A. languida* by Meyer which differs in any important feature from *A. petiolaris*, Hochst. Therefore 119, *languida*, Müll. Arg. (1865) is not a valid species. The same remark is called for in the case of 120, *tenuis*, Müll. Arg. (1865), to which Müller has attributed two varieties which do not differ from each or from *A. petiolaris*, Hochst., by any tangible character.

In the case of 117, *Zeyheri*, Müller has deviated very considerably from the treatment accorded to that species by Baillon when he founded it in 1863. Baillon's original types were Zeyher,

3839, and a specimen of doubtful provenance bearing the number 301, which Müller has been able to assign to Krebs. This latter specimen Müller transfers to *A. pedunculares*, var. *psilogyne*, Müll. Arg. But Müller's modification of *A. Zeyheri* by no means ends here, for he treats *A. Zeyheri*, Baill. (1863) as merely a variety, var. *glabrata*, of an enlarged *A. Zeyheri*, Müll. Arg. (1864), the other variety of which, var. *pubescens*, is in intention identical with the original *A. pedunculares*, E. Mey. (1843). There is no clue in the earlier account given by Müller in *Linnaea*, vol. xxxiv., to the idea underlying this arrangement. Apparently as an afterthought, a character is added in the account given in the *Prodromus* which might have served to differentiate *A. Zeyheri*, Müll. Arg., hardly of Baill. from *A. pedunculares*, Müll. Arg., not of E. Mey and hardly of Meisn., had it been constant. This character is that in *A. Zeyheri*, as widened by Müller, the flowers are monoecious, whereas in *A. pedunculares* they are dioecious. It is true that in some, but by no means all, of the specimens actually included by Müller in his *A. Zeyheri*, var. *pubescens*, the flowers are monoecious. But there is not a single example of Zeyher, 3839, which is all that Müller has left in *A. Zeyheri*, var. *glabrata*, in which the flowers are monoecious. In his choice of the varietal name *glabrata* to designate Baillon's original *A. Zeyheri*, Müller has been singularly unfortunate. The name was selected under the impression that the plant in question is *A. pedunculares*, var. *glabrata*, Sond. We know, as Müller clearly also knew, that Sonder had without due consideration, written this name upon his example of Zeyher 3839, the gathering on which *A. Zeyheri*, Baill., was based. But this does not alter the fact that Sonder's description of *A. pedunculares*, var. *glabrata*, does not apply to this plant, or modify the circumstance that the plant on which Sonder's description of *A. pedunculares*, var *glabrata*, was based, was treated by Baillon as the basis of a distinct species, *A. caperonioides*, Baill., which Müller, in 1866, though not in 1865, has referred as a distinct variety to his *A. pedunculares*.

The same entanglement marks Müller's treatment of his *A. Zeyheri*, var. *pubescens*. The specimens collected by Masson, Krebs, and Ecklon and Zeyher, which Baillon refers to *A. pedunculares*, var. *genuina*, are identical with those collected by Drège, which are referred to *A. Zeyheri*, var. *pubescens*. The latter are by no means invariably monoecious, the former by no means invariably dioecious, and the idea that Meisner was in error when he identified with Meyer's plant so named a species from Natal which he described for Krauss as *A. pedunculares*, is without foundation. At the same time *A. Zeyheri*, Baill., remains a perfectly valid species, but one with which *A. pedunculares*, var. *glabrata*, Sond., is not synonymous.

If the treatment accorded by Müller to *A. Zeyheri*, Baill., leaves something to be desired, this is more markedly the case as regards the treatment of *A. pedunculares*. In this species, Müller has recognised as many as seven varieties :—(*α*) caperonioides ; (*β*) genuina ; (*γ*) psilogyne ; (*δ*) crassa ; (*ε*) punctata ; (*ζ*) glandulifolia ; (*η*) angustata. Of these *α*, caperonioides is a valid species, *A. caperonioides*, Baill. (1863), the earliest name for which, *A. pedunculares*, var. *glabrata*, Sond. (1850), Müller has transferred, as a

synonym, to *A. Zeyheri*, var. *glabrata*; β, genuina is identical with Müller's own *A. Zeyheri*, var. *pubescens*; γ, psilogyne is a mixture of two plants, one of which, Zeyher, 3838, is referable to *A. peduncularis* proper, the other, Krebs 301, to *A. Zeyheri*, var. *glabrata*; δ, crassa, is in reality a variety of *A. peduncularis*; ε, punctata is a valid species, *A. punctata*, Meisn. (1845); ζ, glandulifolia is another valid species, *A. glandulifolia*, Buching (1845); η, angustata is yet another valid species, *A. angustata*, Sond. (1850), though in this case Müller has confused with it another very distinct species, represented by Wahlberg's specimen, viz.:—*A. depressinervia*, K. Schum. (1900) = Ricinocarpus depressinervius, *O. Kuntze* (1893).

In the case of 121, *patens*, Müll. Arg. (1866), another and somewhat different misapprehension has arisen.

Müller based his description of this species on a plant in the Hornemann herbarium at Copenhagen, and he attributed the habitat to South Africa. We are greatly indebted to Dr. Ostenfeld for the loan of this specimen, which on examination proved to be very different from any other species of the genus known to occur at the Cape. Moreover, we are unaware that Hornemann ever visited or even received any collections from that region.

Pinned to the sheet is the following note written by Müller:—"Species Americanae inter 'Capitatae' non occurrunt ex hanc ob rem e Capite Bonae Spei potius quam ex Antillis provenientem censeo." On the back of the mounting paper is written "Cap. b. Sp. v. Ind. occid.", and it may be worth noting that the first half of this seems to be in a smaller and different handwriting from the other, although the "v." appears to have been penned by the same hand as the "Ind. occid."

On comparing the plant with West Indian specimens, it was found to be identical with *Acalypha chamaedrifolia*, var. β, *genuina*, Müll. Arg. The original of this is *Croton chamaedrifolius*, Lam.,* which again was founded on a West Indian plant described and well figured by Plumier† under the name *Croton foliis cordatis*.

It is probable that if Müller had examined his original specimen of *A. patens* more critically he would not have written the above note. He described the terminal spike as being entirely female and often congested like a head, with lateral bisexual ones produced from the axils of the upper leaves. In the type, however, we have found a short male spike at the top of each terminal inflorescence just as in the lateral ones, and exactly as in the West Indian plant figured by Plumier. On account of this misapprehension, Müller came to the conclusion that his plant must belong to a group which is characterized by having a terminal female spike and lateral more or less entirely male ones. As this group is entirely African, Müller had no hesitation in assuming that the habitat of this plant must be South African.

Further research showed that Hornemann had described a West Indian plant in his collection under the name *Acalypha adscendens*, and he indicated its affinity with *A. reptans*, Swartz, which is undoubtedly the same as the form of *A. chamaedrifolia* already mentioned. Müller in DC. Prodr., relying on Hornemann's

* Encycl. vol. ii. p. 215 (1786).
† Plant. Amer. t. 172, fig. 2 (1757).

description, has actually reduced this species to his *A. chamaedrifolia*, and we have little doubt that in doing so he was really dealing with his own type of *A. patens*, for Hornemann's diagnosis agrees so well with this specimen that we have no hesitation in concluding that the descriptions of both authorities were based on the same specimen though Hornemann's specific name is not inscribed on the sheet.

It seemed therefore necessary to ascertain whether any other specimen bearing the name *A. adscendens*, Hornem., existed in the Hornemann collection or in the general herbarium at Copenhagen, and on enquiring of Dr. Ostenfeld he kindly replied as follows :—

"I have carefully looked over all our Acalyphas from the West Indies and also from other parts, but we have no specimen named *A. adscendens*, Hornem.; there are several named '*A. reptans*' and '*A reptans?*' by Hornemann, and it [his *A. adscendens*] may have been one of these, but I think it is more probable that it is the specimen upon which Müller has described his *A. patens*. I have also enquired for *A. adscendens* in the Garden, where it was cultivated in Hornemann's time, but it is not there, at least not so named . . . I think that your suggestion regarding the identity of *A. patens* and *A. adscendens* is right, and at any rate Müller's argument about the origin of his plant is not feasible, for we have here in Copenhagen many old plants from the West Indies, but very scanty collections from Africa."

Briefly summarized then we find that *Acalypha patens*, Müll. Arg., was collected in the West Indies, and not in South Africa as stated by Müller, that its description was drawn up from the type of *A. adscendens*, Hornemann, which is identical with *A. chamaedrifolia*, var. *genuina*.

Since Müller's account of *Acalypha* was published in 1866, there have been only two important contributions to our knowledge of the South African species of the genus. The first of these is that by O. Kuntze (*Rev. Gen. Pl.* vol iii, pars 2, pp. 291, 292), published in 1893 under *Ricinocarpus*, and we are indebted to the kindness of Dr. N. L. Britton, New York, for an opportunity of studying Kuntze's actual material. Here (p. 291) is given an account of a very distinct species *R. depressinervius*, O. Kuntze, changed later by K. Schumann to *A. depressinervia*; also a diagnosis of a new form, *pilosior*, O. Kuntze, of *A. glabrata*, Thunb. Kuntze's specimens, however, show that *R. crenatus*, from Mozambique recorded on this page is not *Acalypha crenata*, Hochst., but is *A. glomerata*, Hutchinson.

On p. 292 are given diagnosis of two varieties of *A. peduncularis*; one of these, var. *ovatifolius*, O. Kuntze, is the plant previously described as *A. crassa*, Buching.; the other, var. *Radula*, O. Kuntze, appears to be a distinct species for which the new name *A. Wilmsii* has been suggested by Professor Pax. As the plant is very different from *A. Radula*, Baker, Dr. Pax's name has been here adopted. Kuntze's specimens, however, show that while *R. peduncularis*, var. *punctatus*, recorded on this page, is really *Acalypha punctata*, Meisn., the plant cited as *R. peduncularis*, var. *genuinus*, is not the original *A. peduncularis*, E. Mey., Meisn., but the same thing as his own var. *Radula* and therefore is *A. Wilmsii*. Kuntze's other African specific determinations are accurate.

The second contribution to be noticed is that by Pax in *Bull. Herb. Boiss.* vol. vi. pp. 733, 734, published in 1898. Here four forms are referred to, all of them as new. As a matter of fact, however, every one of them had already been accounted for They are :— A. glabrata, var. pilosa, *Pax* l.c. 733 = pilosior *O. Kuntze* (1893); A. Rehmanni, *Pax* l.c. 733 = A. senensis, *Klotzsch* (1862); A. Schinzii, *Pax* l.c. 734 = Ricinocarpus depressinervius, *O. Kuntze*, (1893); A. Schinzii, var. denticulata, *Pax* l.c. 734 = A. angustata, *Sond.* (1850). The only other contribution to be noted is that by Sim in *The Forests and Forest Flora of Cape Colony*, published in 1907 where (p. 318) a really intelligible account of *A. glabrata*, Thunb. is given.

The number of species known from South Africa is now twenty. In the list of these which follows we have in each case given a detailed account of the distribution in South Africa of the species concerned and in all those cases where a species has not already been dealt with by one of us in the *Flora of Tropical Africa* its synonymy is given in full. Of the twenty species here recognised the last nine, all of which have subsessile leaves, would probably have been included by Müller in *A. peduncularis* ; as a matter of fact all of them save *A. entumenica*, Prain, and *A. Wilmsii*, Pax, here for the first time described, were so included by Müller. The nine species with subsessile leaves here recognised are, however, as easily discriminated and as distinct as the eleven which have petioled leaves.

Conspectus of the South African Species of Acalypha.

1. **Acalypha Sonderiana**, *Müll. Arg. in Linnaea* xxxiv. 9 (1865) *et in DC. Prodr.* xv. ii. 804 (1866). Arbor parva ; spicae superne foemineae, inferne masculae.—*A. ? petiolaris*, Sond. in Linnaea xxiii. 117 (1850) ; Walp. Ann. iii. 367 (1852). *Ricinocarpus Sonderianus*, O. Kuntze, Rev. Gen. Pl. ii. 618 (1891).

Natal : near Durban, *Gueinzius*, 11 ! 510 ! *Gerrard* ! *Gerrard & McKen*, 1625 !

2. **Acalypha glabrata**, *Thunb. Prodr. Pl. Cap.* 117 (1800), *et in Flor. Cap. ed. Schult.* 545 (1823); *Spreng. Syst.* iii. 882 (1826) ; *E. Mey. in Drège Zwei Pfl. Documente*, 161 (1843) ; *Eckl. & Zeyh. in Flora*, xx. 213 (1847) ; *Sim in For. Fl. Cap. Col.* 318, t. 142, fig. 2 (1907). Folia glabra, nunquam ultra 4 cm. longa, 2–2·5 cm. lata.— *A. betulina* ?, E. Mey. l. c. (1843). *A. betulina*, Sond. in Linnaea, xxiii. 116 (1850) ; Baill. Adansonia, iii. 157 (1862) ; non Retz. *A. glabrata*, var. *genuina*, Müll. Arg. in Linnaea, xxxiv. 36 (1865) et in DC. Prodr. xv. ii. 857 (1866). *Ricinocarpus glabratus*, O. Kuntze, Rev. Gen. Pl. ii. 618 (1891). *R. glabratus*, var. *genuina*, O. Kuntze, l.c. iii. ii. 291 (1893).

Cape Colony : Uitenhage Div. ; between the Kromme River and Uitenhage, *Zeyher*, 1517a partly ! Addo, *Burke* ! Enon, *Drège* 2332 ! near Uitenhage, *Thunberg* ! *Prior* ! Port Elizabeth Div. ; Krakakamma Forest, *Ecklon & Zeyher*, 72 partly ! *Ecklon* 1124 ! *Zeyher*, 1517a partly ! Bathurst Div. ; Port Alfred, 300 ft., *Schlechter*, 2692 ! *Potts*, 197 ! near the Kowie River, *Ecklon & Zeyher*, 1517a partly ! Albany Div. ; Grahamstown, *Drège* 2332 ! *Ecklon* 1124 ! *Zeyher*, 72 partly ! *Ecklon & Zeyher*, 1517a partly ! *Burke* ! *Harvey*, 1 ! *Wilmot* ! *Bolus*, 1 ! *Galpin*, 1 ! *Schlechter*, 2692 ! *Potts*, 197 ! Bathurst Div. ; Port Alfred, 300 ft., *Schlechter*, 2692 ! *Potts*, 197 ! near the Kowie River, *Ecklon & Zeyher*, 1517a partly ! Albany Div. ; Grahamstown, *Drège* 2332 ! *Ecklon* 1124 ! *Zeyher*, 72 partly ! *Ecklon & Zeyher*, 1517a partly ! *Burke* ! *Harvey*, 1 ! *Wilmot* ! *Bolus*, 1 ! *Galpin*, 1 !

Zeyher, 72 partly! Fort Beaufort Div.; near Fort Beaufort, 1000–2000 ft., *Ecklon & Zeyher*, 72 partly! at the foot of the Witbergen, between the Gariep and the Caledon River, *Ecklon and Zeyher*! East London Div.; East London, *Rattray*, 123! British Caffraria; without locality, *Cooper*, 228!

Transkei: Bashee River, *Drège* b (under *A. betulina*) partly! Kentani, 1000 ft., *Miss Pegler*, 874 partly!

Tembuland: Perie Forest, *Kuntze*!

Pondoland: Port St. John, at Isnuka, *Galpin*, 3484 partly! between the Umtata River and St. John's River, *Drège*, 4655!

Natal: Durban, 50 ft., *Schlechter*, 2931! *Rehmann*, 8976! Clairmont, *Engler*, 2518a! *Kuntze*!

Transvaal: Crocodile River, *Leendertz*, 716! Shilouvane, *Junod* 1100!

Forma pilosior, *O. Kuntze* (sub *Ricinocarpum*); folia persistenter pubescentia, nunquam ultra 4 cm. longa, 2–2·5 cm. lata.—*Ricinocarpus glabratus*, *a* (*genuinae*) forma *pilosior*, O. Kuntze, Rev. Gen. Pl. iii. ii. 291 (1893).

Cape Colony: Komgha Div.; Prospect Farm, 2100 ft., *Flanagan*, 409! near Kei River, 2000 ft., *Schlechter*, 6250!

Tembuland; Perie Forest, *Kuntze*!

This form only differs from typical *A. glabrata*, Thunb., in having persistently pubescent leaves.

Var. latifolia, *Müll. Arg. in Linnaea*, xxxiv. 36 (1865) *et in DC. Prodr.* xv. ii. 857 (1866). Folia primum secus nervos prope basin subtus parce pilosa, cito fere glabra, 5–8 cm. longa, 4–6·5 cm. lata.—*A. betulina*, E. Mey. in Drège Zwei Pfl. Documente, 161 (1843) pro parte maxima; Eckl. & Zeyh. in Linnaea xx. 213 (1847); nec Retz. *A betulina*, var. *latifolia*, Sond. in Linnaea xxiii. 117 (1850). *Ricinocarpus glabratus*, var. *latifolius*, O. Kuntze, Rev. Gen. Pl. iii. ii. 291 (1893).

Transvaal: Zoutspansberg, near Goldgedacht, 3700 ft., *Schlechter*, 4602 partly! Blaauwberg, *Schlechter*! Barberton, *Thorncroft*, 4328!

Cape Colony: Uitenhage Div.; Addo, 1000–2000 ft., *Zeyher*, 1517b! Zwartkops River, *Prior*! Alexandria Div.; banks of the Bushman River, *Zeyher*, 1517c! Bathurst Div.; Kasuga, *Mac Owan*, 715! Komgha Div.; Kei Bridge, 560 ft., *Rogers*, 4506! Kei River near Komgha, 600 ft., *Flanagan*, 2318!

Transkei: Bashee River, *Drège* b (under *A. betulina*) partly! Kentani, 1000 ft., *Miss Pegler*, 874 partly!

Pondoland: Port St. John, Isnuka, *Galpin*, 3484 partly!

Natal: near Durban, 150 ft., *Drège* c (under *A. betulina*)! 4593! 4610! *Gueinzius*, 476! *Gerrard & McKen*, 546! *Gerrard*, 82! *Rehmann*, 8977! *Wood*, 1715! *Scott Elliot*, 1691! *Wilms*, 2267! Clairmont, *Engler*, 2524,! *Kuntze*! Inanda, *Wood*, 404! 430! Friedenau, 1750 ft., *Rudatis*, 1166!

This variety, though vaguely indicated by E. Meyer and by Ecklon and Zeyher, and more definitely recognised both by Sonder and by Müller, and though here formally defined and segregated is probably not a valid one. It differs only as regards the size of the leaves from typical *A. glabrata*, Thunb., and not infrequently the two forms have been collected in the same locality and issued under the same

number. The first instance of this occurs in the case of Drège, whose "A. betulina b" from the Bashee River is a mixture of the two glabrous varieties. The second instance is hardly less instructive; Burke and Zeyher, collecting together at Addo in Uitenhage, have distributed one the typical, the other the broad-leaved variety of "A. glabrata." But the same experience has been met with by collectors so competent as Mr. Galpin and Miss Pegler, whose respective field-numbers 3484 and 874 cover the same "mixture" of what Sonder and Müller have supposed to be distinct varieties. It is unnecessary to suppose that collectors so careful as those cited must be in error; indeed there is nothing to show that the specimens which conform with the characters of Müller's two varieties have not been taken from the same bush. With very little trouble the two varieties might even be manufactured because in a considerable number of instances—specimens of Drège's "A. betulina b," of Wood 430, and of Gerrard 82 may be cited as examples—the leaves at the ends of the twigs are those of var. *latifolia*, those lower down on the twig are those of typical *A. glabrata*. Such specimens bear out the statement of Sim (For. Fl. Cap. Col. p. 318) who speaks of "growth made during drought having leaves 1 inch long or less, that made during rains having leaves 3 inches long." It is therefore not only possible but probable that Sonder's variety "latifolia" is merely a condition, not even a form, still less a true variety.

Var. pilosa, *Pax*. Folia persistenter pubescentia, 5-8 cm. longa, 4-6·5 cm. lata.—*A. velutina*, E. Mey. in Drège Zwei Pfl. Documente 161 (1843). *A. betulina*, E. Mey. l.c. (1843) partim et quoad Drège 4595 tantum. *A. glabrata*, var. *pilosa*, Pax in Bull. Herb. Boiss. vi. 733 (1898).

Transvaal: Zoutspansberg; near Goldgedacht, *Schlechter*, 4602 partly!

Cape Colony: Bathurst Div.; Fish River, near Trumpeter's Drift, *Drège*, a (under *A. betulina*)! 4595! Komgha Div.; Kei Bridge, 1800 ft. *Flanagan*, 1214!

Transkei: Bashee River, *Drège* (*A. velutina*)! Kentani, *Miss Pegler*, 606!

Natal: Inanda, *Wood*, 1241 (a transition form)! Tugela, Colenso, *Gerrard & McKen*, 1623! *Rehmann*, 7164!

The form named var. *pilosa* by Dr. Pax bears to the form termed var. *latifolia* by Sonder, Müller and Kuntze very much the relationship that the form named f. *pilosior* by Kuntze bears to typical *A. glabrata*. Some of the specimens, notably those issued by Mr. Medley Wood as 1241, and those distributed by Dr. Schlechter as 4602, are almost exactly intermediate between var. *latifolia* and *A. velutina*, E. Mey (= var. *pilosa*, Pax). It is therefore almost as doubtful whether it is worth while recognising a pubescent as apart from a glabrous variety of *A. glabrata* as it is to distinguish between a large-leaved and a small-leaved variety. There is, however, a certain advantage in recognising the variety proposed by Pax; there is none in recognising the variety proposed by Sonder. The abandonment of Sonder's variety admits of the union of Kuntze's form with Pax's variety and Kuntze's name, having priority, is the one which should be adopted.

The most natural treatment for this species would therefore appear to be to treat it as including but one variety in addition to the type, as follows :—

Acalypha glabrata, *Thunb. uti supra ; var.* latifoliam, *Müll. Arg. uti supra inclusam.*

β var. **pilosior** *Prain* ; *var.* pilosam, *Pax* (1898) *et formam* pilosiorem, *O. Kuntze* (1893) *uti supra includens.*

3. **Acalypha glomerata**, *Hutchinson* in Kew Bulletin, 1911, 229 (1911) et in Dyer Fl. Trop. Afr. vi. i. 902 (1912). *Ricinocarpus crenatus*, O. Kuntze, Rev. Gen. Pl. iii. 2, 291 (1893) ; nec id. ii, 617.

Lourenço Marques : Lourenço Marques, *Howard*, 5696 !

There is nothing to add to the account of this species given by one of us in the Flora of Tropical Africa except to record the fact that it extends beyond the tropic into South Africa.

4. **Acalypha ciliata**, *Forsk. Fl. Aegypt.-Arab.* 162 (1775) ; *Hutchinson in Dyer, Fl. Trop. Afr.* vi. i. 901 (1912).

Transvaal : Shilouvane, *Junod*, 1028 ! 2188 !

There is nothing to add to the account of this species given by one of us in the Flora of Tropical Africa except to record the fact that it extends beyond the tropic into South Africa.

5. **Acalypha indica**, *Linn. Sp. Pl.* ed. 1, 1003 (1753) ; *Hutchinson in Dyer Fl. Trop. Afr.* vi. i. 903.

Transvaal : Vaal River, *Burke* ! near Hausman's Kraal, 4400 ft., *Schlechter*, 4185 ! Avoca, near Barberton, 1900 ft., *Galpin*, 1237 ! Komati Poort, *Kirk*, 105 ! Shilouvane, *Junod*, 1321 ! 1615 !

Natal : Tugela, *Gerrard & McKen*, 1624 !

The synonymy and the distribution outside South Africa of this species has already been fully discussed by one of us in the Flora of Tropical Africa.

6. **Acalypha segetalis**, *Müll. Arg. in Journ. Bot.* ii. 336 (1864) ; *Hutchinson in Dyer, Fl. Trop. Afr.* vi. i. 904 (1912).

Transvaal : Waterberg ; Springbok Flats, *Sampson*, 4410 ! Shilouvane, *Junod*, 2346 !

Great Namaqualand : Rehoboth, *Fleck*, 170 !

Little Bushmanland : without locality, *Fleck*, 472a !

Lourenço Marques : Lourenço Marques, *Quintas*, 210 ! Matola, *Schlechter*, 11,686 ! Incanhini, *Schlechter*, 12,043 !

A species exceedingly closely allied to *A. indica*, Linn., the synonymy of which has been fully discussed by one of us in the Flora of Tropical Africa. The only addition which has to be made to that record is to note the fact that it extends southward beyond the tropic on the western as well as on the eastern side.

7. **Acalypha capensis**, *Prain.* Caules dense patenter pilosi ; folia basi saepissime cordata, subtus ubique dense pilosa ; spicae foemineae paucibracteatae in axillis supremis axillares.—*Urtica capensis*, Linn. f. Suppl. 417 (1781). *U. africana*, Linn. Mss. ex. Jackson, Ind. Linn. Herb. 148 (1912). *Tragia villosa*, Thunb. Prodr. Cap. 14 (1794) et in Flor. Cap. ed. Schult. 37 (1823) nequaquam *Acalypha villosa*, Jacq. *Acalypha Kraussiana*, Buching. ex Meisn. apud Krauss in Flora xxviii. 84 (1845) ; Müll. Arg. in Linnaea xxxiv.

39 (1865). *A. decumbens*, *a*, *villosa*, Müll. Arg. in DC. Prodr. xv. ii. 864 (1866) quoad spp. omnia. *A. cordata*, Burchell Mss. nec Thunb.

Cape Colony: George Div.; Outeniqua Mountains, *Thunberg*! *Rehmann*, 258! Knysna Div.; near Knysna, *Burchell*, 5390! 5391! *Krauss*, 1825! Wittedrift, Plettenbergs Bay, *Pappé*!

Forma **grandidentata**. Caules foliaque uti in forma praecedenti, sed spicae foemineae pluribracteatae terminales.—*A. grandidentata*, Müll. Arg. in DC. Prodr. xv. ii. 823 (1866).

Cape Colony: Knysna Div.; near Knysna, *Burchell*, 5392! without precise locality, *Mund & Maire*, 659!

Forma **decumbens**. Caules glabri; folia basi truncata vel parum cordata, subtus argillaceo-incana.—*A. decumbens*, Thunb. Prodr. Pl. Cap. 117 (1800) et in Flor. Cap. ed. Schult. 545 (1823); Spreng. Syst. iii. 882 (1826). *A. discolor*, E. Mey. in Drège Zwei Pfl. Documente, 161, nomen (1843) ex parte; Eckl. & Zeyh. in Linnaea xx. 213 (1847) ex parte; Baill. Adansonia iii. 157 (1862); Müll. Arg. in Linnaea, xxxiv. 38 (1865) ex parte. *A. decumbens*, γ, *genuina*, Müll. Arg. in DC. Prodr. xv. ii. 864 (1866). *A. prostrata*, Zeyh. Mss. in Herb. Holm. *Ricinocarpus decumbens*, O. Kuntze, Rev. Gen. Pl. ii. 617 (1891).

Cape Colony: Humansdorp Div.; Gamtous River, *Thunberg*! Near Humansdorp, *Ecklon & Zeyher*, 73 partly! *West*, 276! Uitenhage Div.; Zwartkops River, *Drège*! *Ecklon*, 162! without precise locality, *Mund & Maire*, 33! *Zeyher*!

Forma **cordata**. Caules glabri; folia basi saepissime distincte cordata, subtus dense olivaceo-puberula.—*A. cordata*, Thunb. Prodr. Pl. Cap. 117 (1800) et in Flor. Cap. ed. Schult. 545 (1823); Spreng. Syst. Veg. iii. 880 (1826). *A. discolor*, E. Mey. in Drège Zwei Pfl. Documente, 161, nomen (1843) ex parte; Hochst. apud Krauss in Flora xxviii. 84 (1845); Eckl. & Zeyh. in Linnaea xx. 213 (1847) ex parte; Müll. Arg. in Linnaea, xxxiv. 38 (1865) ex parte; Zeyh. Mss. *A. discolor*, β *major*, Baill. Adansonia iii. 158 (1862). *A. decumbens*, β *cordata*, Müll. Arg. in DC. Prodr. xv. ii. 864 (1866). *A. decumbens*, Burchell Mss. vix Thunb.

Cape Colony: Riversdale Div.; between Little Vet River and Garcias Pass, *Burchell*, 6925! near Riversdale, *Schlechter*, 1961! Knysna Div.; Gouw Kamma River, *Krauss*, 1826! near Knysna, *Marloth*, 2448 partly! Humansdorp Div.; Riverside at Humansdorp, *Ecklon & Zeyher*, 73 partly! *Galpin*, 4576! Uitenhage Div.; Maitland River near the lead mines, *Burchell*, 4494! without precise locality, *Thunberg*! *Sparrman*! *Zeyher*!

Forma **lamiifolia**. Caules parce molliter pilosi; folia basi saepissime distincte cordata, subtus praesertim secus nervos dense patenter pilosa.—*A. lamiifolia*, Scheele in Linnaea xxv. 584 (1852); Baill. Adansonia, iii. 158 (1862). *A. decumbens*, *a villosa*, Müll. Arg. in DC. Prodr. xv. ii. 864 (1866) ex citatione tantum.

Cape Colony: Riversdale Div.; banks of the Vet River near Riversdale, *Muir*, 283! Knysna Div.; near Knysna, *Marloth*, 2448 partly! Albany Div.; without locality, *Bowie*! without precise locality, *Drège* 8242!

A. decumbens is a species of even greater variability than *A. glabrata*, and the five forms here characterised are readily recognisable. This has always been appreciated. Thunberg over a century

ago accorded specific rank to three of these forms; one of the three he referred to another genus. The synonymy cited shows that similar if varying views had been held by other writers. The treatment by Müller, whose careful monograph of 1866 has not since then been critically examined, involved the recognition of four of these five forms, three of them as varieties of *A. decumbens*, the last as a distinct species, *A. grandidentata*.

More closely examined, however, this last form, though at first sight apparently the most distinctive of all, proves in reality to be undeserving of separate recognition. It differs from *Urtica capensis*, as described by the younger Linnaeus in 1781 and from *Tragia villosa*, as described by Thunberg in 1794, which is the same as *A. Kraussiana*, described by Meisner in 1845, only in having the female inflorescences aggregated in a terminal spike in place of being disposed in the axils of the uppermost leaves. In spite of the different facies thus imparted to these two plants, *A. grandidentata* is merely a condition of *A. Kraussiana*, Meisn. (= A. decumbens, var. villosa, *Müll. Arg.*).

The distinction between the typical *A. decumbens* of Thunberg and the form which that author described as *A. cordata* is hardly more tangible. In the original specimens of *A. decumbens* the leaves are all reddish-hoary underneath and are all truncate or only slightly cordate at the base, while in the original specimens of *A. cordata* the leaves are all olive-hoary beneath and are nearly all distinctly cordate at the base. But it was not owing to these real differences that the two forms were separated as species by Thunberg; the main character relied on for their separation was that *A. decumbens* is herbaceous while *A. cordata* is shrubby. Thunberg's belief we know now to be without foundation; we now know too that while the main branches have leaves that conform with those of the original *A. cordata*, the secondary branches have leaves that agree with those of the original *A. decumbens*. This was fully appreciated by E. Meyer in dealing with Drège's specimens, some of which, and some also of Zeyher's, show both forms on the same branch; the name *A. discolor*, suggested by E. Meyer, happily indicates the peculiar difference in the colour of the underside of the cordate and the less distinctly cordate leaves. *A. cordata*, Thunb., therefore, so far from being even a distinct variety, is merely a condition of *A. decumbens*.

The only remaining form is that which was originally described by Scheele as *A. lamiifolia*. Though reduced by Müller, in the absence of specimens, to var. *villosa* it resembles much more closely in its general appearance Müller's var. *cordata* from which indeed it only differs in having the nerves beneath pilose with long hairs instead of having the nerves very shortly puberulous. Now it is found that even this distinction breaks down, since in certain specimens collected by Marloth we find leaves characteristic of *A. cordata* and leaves characteristic of *A. lamiifolia* in plants which have grown side by side. The true position of the form *lamiifolia* is midway between the forms *cordata* and *villosa* and the true significance of the form does not lie in its differences from these two, but in its testimony that they themselves do not really differ from each other.

Having regard, however, to the extreme diversity of view which has hitherto prevailed, and to the convenience from the bibliographical standpoint which the division of the species involves, it

seems better to separate those forms with long hairs on the leaves beneath from the forms in which there is only a short close hoary tomentum; treating the former, which coincides with Müller's variety *a*, *villosa* but includes also *A. grandidentata*, as the type, and treating the latter as a distinct variety, *β*, *decumbens*, which includes Müller's variety *β*, *cordata*.

8. **Acalypha senensis**, *Klotzsch in Peters Reise Mossamb. Bot.* 96 (1862); *Hutchinson in Dyer, Fl. Trop. Afr.* vi. i. 888 (1912).—Spicae 1-sexuales; plantae monoicae; folia longe petiolata; caules erecti; bracteae foemineae glandulis stipitatis dense obsitae, nec tamen setosae.

Bechuanaland: Masupa River in Banquakatse Territory, *Holub*!

Transvaal: near Pretoria, *Burke*! *Scott Elliot*, 1398! *Rehmann*, 4285! *Fehr*, 58! *Wilms*, 1321a! *Burtt Davy*, 695! 725! 5380! *Bolus*, 10838! *Leendertz*, 56! Aapies River, *Burke*! Boshveld, Klippan, *Rehmann*, 5330! Houtbosch, *Rehmann*, 5915! Rustenberg, *Collins*, 70! Warmbaths, *Leendertz*, 1561! Waterval Onder, *Jenkins*, 6717! Lydenberg, *Wilms*, 1321 partly! Johannesberg, *Marloth*, 3830! Shilouvane, *Junod*, 1039! 2178!

Very close to, but still probably deserving to be considered a species apart from *A. petiolaris*, Hochst. A full account of the distribution of this species in Tropical Africa, where it is rather widely spread, and of its synonymy, has been given by one of us in the Flora of Tropical Africa.

9. **Acalypha petiolaris**, *Hochst. apud Krauss in Flora* xxviii. 83 (1845); *Müll. Arg. in Linnaea* xxxiv. 29 (1865) *et in DC. Prodr.* xv. ii. 847 (1866).—Spicae 1-sexuales; plantae monoicae; folia longe petiolata; caules decumbentes, bracteae foemineae dense setosae, parcissime glandulosae.—*A. languida*, E. Mey. in Drège Zwei Pfl. Documente, 161, nomen (1843); Sond. in Linnaea xxiii. 116 (1850); Baill. Adansonia, iii. 157 (1863); Müll. Arg. in Linnaea xxxiv. 29 (1865) et in DC. Prodr. xv. ii. 848 (1866). *A. brachiata*, Krauss in Flora xxviii. 83 (1845), nec E. Mey. *A. tenuis*, Müll. Arg. in Linnaea xxxiv. 30 (1865) et in DC. Prodr. xv. ii. 848 (1866), var. *a*, *glandulosa* et var. *β*, *eglandulosa* amb. inclus. *Ricinocarpus languidus*, O. Kuntze, Rev. Gen. Pl. ii. 618 (1891). *R. petiolaris*, O. Kuntze, Rev. Gen. Pl. ii. 618 (1891).

Cape Colony: Komgha Div.; near the Kei River mouth, *Flanagan*, 454!

Transkei: Bashee, *Drège*, a! 4594! Kentani, *Miss Pegler*, 870!

Pondoland: between the Umtata River and St. John's River, *Drège*, b! Murchison, *Bachmann*, 791!

Griqualand East: Clydesdale, 2500 ft., *Tyson*, 1232! 2568! 2693! 2694!

Natal: near Durban, *Krauss*, 319! *Gueinzius*, 169! 506! *Gerrard & McKen*, 617! *Rehmann*, 8803! *Wood*, 68! 1408! near Phoenix, *Schlechter*, 3026! near Maritzburg, *Krauss*, 367! Inanda, 2000 ft., *Wood*, 254! Camperdown, 2000 ft., *Miss Franks in Herb. Wood*, 11771! *Rehmann*, 7795! between Umzimkulu River and Umkomanzi River, *Drège*, c! 8421! Umgeni, *Rehmann*, 8802 partly! Umkomaas, *Engler*, 2569! Marianhill, *Landauer*, 223! Friedenau, 1300 ft., *Rudatis*, 1185! without precise locality, *Wahlberg*!

Lourenço Marques: Ressano Garcia, *Schlechter*, 11882! Lourenço Marques, *Junod*, 147!

Transvaal: Macalisberg, *Wahlberg*! *Burke*! *Zeyher*, 1519! Wonderboompoort, *Leendertz*, 443! Potgietersrust, *Leendertz*, 2313! near Lydenberg, *Wilms*, 1321 partly! Elandspruitberg, *Schlechter*, 3897! near Barberton, 1900–4000 ft., *Galpin*, 513! 1245! Matkibi's Kom, 500 ft., *Bolus*, 9777! Kaap River, 1200 ft., *Bolus*, 9778!

Swaziland: Low Veld near Mafutane, *Bolus*, 12294!

A very distinct species, broken up by Müller into three, which, however, do not differ from each other even as varieties.

10. **Acalypha Eckloni**, *Baill. Adansonia*, iii. 158 (1863); *Müll. Arg. in Linnaea*, xxxiv. 30 (1865) *et in DC. Prodr.* xv. ii. 849 (1866).—Spicae 1-sexules; plantae monoicae, annuae.—*A cordata*, E. Mey. in Drège, Zwei Pfl. Documente, 161 (1843); Baill. Adansonia, iii. 158 (1863); non Thunb. *A. brachiata*, E. Mey., in Drège, Zwei Pfl. Documente, 161, nomen (1843); Baill. Adansonia, iii. 158 (1863). *Ricinocarpus Ecklonii*, O. Kuntze, Rev. Gen. Pl. ii. 617 (1891) et iii. ii. 291 (1893).

Cape Colony: George Div.; woods near George, 1000 ft., *Schlechter*, 2350! Uitenhage Div.; near Uitenhage, *Burchell*, 4251! *Mund & Maire*! *Verreaux*! *Burke*! *Prior*! on Van Stadens Mountains, *Burchell*, 4751! Zwartkops River, *Drège*, 4602! *Ecklon*, 74 partly! 609! *Zeyher* 228! 3841! Enon, *Drège*, 2345! 4600! Albany Div.; near the Kasuga River, *Prior*! Kleinemund near Grahamstown, *MacOwan*, 1507! Grahamstown, *Misses Daly & Gane*, 743! King Williamstown Div.; Yellowwood River, *Drège*; King Williamstown, *Sim*, 1468! East London Div.; East London, *Galpin*, 7790! *Rattray*, 809! Komgha Div.; near Komgha, 2000 ft., *Flanagan*, 630!

Transkei; Gekwa River, *Drège*, 4601! Kentani, 1000 ft., *Miss Pegler*, 732!

Tembuland: Perie Forest, *O. Kuntze*!

Pondoland: St. John's River at Omsamwubo, *Drège*!

Natal: near Durban, *Gueinzius*, 8! 168! Inanda, 1800 ft., *Wood* 3148! near Isipingo, *Schlechter*, 2808!

A very distinct species nearest, in spite of its annual habit, to *A. petiolaris*, Hochst. and *A. senensis*, Klotzsch, but with much larger female bracts. Meyer's name *A. brachiata*, though older than Baillon's by twenty years, was not accompanied by a description and so cannot now be taken up. Meyer recognised two distinct varieties; *a*, with taller stems and almost glabrous leaves, and β with short stems and hirsute leaves. But the ample material now available proves that this distinction cannot be sustained.

11. **Acalypha ornata**, *Hochst. ex A. Rich. in Tent. Fl. Abyss.* ii. 247 (1851); *Hutchinson in Dyer, Fl. Trop. Afr.* vi. i. 890 (1912).

Lourenço Marques: Lion's Creek, *Schlechter*, 12,198!

There is nothing to add to the account of this species given by one of us in the Flora of Tropical Africa except to record the fact that it extends beyond the tropic into South Africa.

12. **Acalypha Zeyheri**, *Baill. Adansonia*, iii. 156 (1863). Folia subsessilia, glabra vel glabrescentia, eglandulosa; caules procumbentes.—*A. Zeyheri*, var. *glabrata*, Müll. Arg. in Linnaea xxxiv. 29

(1865) et in DC. Prodr. xv. ii. 847 (1866) quoad Zeyher 3839 tantum, var. *pubescente*, necnon syn. Sond. amb. excludend. *A. peduncularis*, var. *psilogyne*, Müll. Arg. in Linnaea xxxiv, 28 (1865) et in DC. Prodr. xv. ii. 846 (1866), pro parte et quoad Krebs 301 tantum. *Ricinocarpus Zeyheri*, O. Kuntze, Rev. Gen. Pl. ii. 618 (1891).

Cape Colony: Uitenhage Div.; Van Stadensberg, *Ecklon*, 345! *Zeyher*, 3839! *Burchell*, 4726! *Mrs. Paterson*, 886!

This very local but very distinct and easily recognisable *Acalypha*, described by Baillon as a species, has been accepted as such, but in a rather modified and somewhat unsatisfactory fashion, by Müller, who has recognised as a distinct variety what is, with little room for doubt, a different species, and has included in the variety which is based on Baillon's type yet another and even more distinct species. To add to the confusion Müller has placed all of the three forms thus included in *A. Zeyheri* in as many different places, for his own *A. Zeyheri*, var. *pubescens*, is also his own *A. peduncularis*, var. *genuina*; the plant which Sonder named *A. peduncularis* β, *glabrata* is Müller's own *A. peduncularis*, var. *caperonioides*; finally, one of the types only of *A. Zeyheri*, Baill., is left by Müller in this species, the other is transferred to *A. peduncularis*, var. *psilogyne*.

13. **Acalypha peduncularis**, *E. Mey. in Drège, Zwei Pfl. Documente*, 161, *nomen* (1843) *et ex Meisn. apud Krauss in Flora*, xxviii., 82 (1845); *Eckl. & Zeyh. in Linnaea*, xx. 213 (1847); *Sond. in Linnaea*, xxiii. 115 (1850), *syn. Buching. et var.* glabrata *exclus.*; *Baill. Adansonia*, iii., 156 (1863), *syn. Buching. exclus.*; *Pax in Engl. Pfl. Öst.-Afr.*, C. 239 (1895) *ex parte, spp. nyasica tantum.* Folia subsessilia saepe acuta vel subacuta plus minusve pubescentia, eglandulosa; caules herbacei ramosi procumbentes.—*A. peduncularis*, var. *genuina*, Müll. Arg. in Linnaea, xxxiv. 29 (1865) et in DC. Prodr. xv. ii. 846 (1866). *A. Zeyheri*, var. *pubescens*, Müll. Arg. in Linnaea, xxxiv. 29 (1865) et in DC. Prodr. xv. ii. 847 (1866) nec *A. Zeyheri*, Baill. *Ricinocarpus peduncularis*, O. Kuntze, Rev. Gen. Pl. ii., 618 (1891).

Cape Colony: Uitenhage Div.; Bontje's River, 2000 ft., *Drège*, 2309! Enon, *Drège*! near Zwartkops River, *Ecklon*, 214! Alexandria Div.; Zuureberg, 2000–3000 ft., *Drège*! *Cooper*, 3580! Bathurst Div.; between Blue Krantz and Kaffir Drift, *Burchell*, 3707! at Rietfontein between the Kasuga River and Port Alfred, *Burchell*, 4041! Albany Div.; near Grahamstown, 1500–2500 ft., *Ecklon*, 75 partly! *Bolton*! *Mrs. Barber*! *MacOwan*, 49! *Galpin*, 191! *Bolus*! Slangkraal, *Burke*! Assegai Bush and Botram, 1000–2000 ft., *Drége*, 4596! Howison's Poort, *Zeyher*, 3838! *Mrs. H. Hutton*! near Sidbury, *Burchell*, 4176! Stockenstroom Div.; sources of the Kat River above Philipstown, 3000–4000 ft., *Ecklon*, 75 partly! Peddie Div.; Fredericksburg, *Gill*! East London Div.; near East London, *Rattray*, 678! *J. Wood in Herb. Galpin*, 3136! British Caffraria; Hangman's Bush, *Cooper*, 147! 3581! without locality, *Masson*! *Hb. Swartz*! *Grondal*! *Delalande*! *Krebs*!

Transkei: Kreili's country, *Bowker*, 292! Kentani, 1200 ft., *Miss Pegler*, 65 partly!

Tembuland: near Bazeia, beyond the Bashee River, 2000 ft., *Baur*, 373!

Pondoland: many localities, *Bachmann*, 783! 790! 792! 793! 1711! *Beyrich*, 102!

Natal: near Durban, *Krauss*, 377 partly! *Gueinzius*, 404 partly! *Gerrard & McKen*, 619! *Sanderson*, 129! *Wood*, 1416 partly! Umgeni, *Rehmann*, 8804! Inanda, *Wood*, 48 partly! Camperdown, *Schlechter*, 3059 partly!

Var. β, **crassa**, *Müll. Arg. in Linnaea*, xxxiv. 28 (1865) *et in DC. Prodr.* xv. ii. 846 (1866). Folia omnia obtusa densius pubescentia; caules subsimplices.—*A. crassa*, Buching. ex Meisn. apud Krauss in Flora, xxviii. 83 (1845). *A. peduncularis*, Sond. in Linnaea, xxiii., 115 (1850), quoad syn. *A. crassa*, Buching.; Baill. Adansonia, iii., 156 (1863), quoad syn. *A. crassa*, Buching.: vix E. Mey. *A. peduncularis*, var. *ferox*, Pax Mss. in Wilms exsicc. No. 2265. *Ricinocarpus peduncularis*, var. *ovatifolius*, O. Kuntze, Rev. Gen. Pl., iii., ii., 292.

Natal: near Durban, *Krauss*, 377 partly! *Gueinzius*, 404 partly! *Sutherland*! *Gerrard*, 521! *Wood*, 90! Camperdown, *Gerrard & McKen*, 1166! near Claremont, *Schlechter*, 3059 mainly! Krantzkloof, *Schlechter*, 3188! Inanda, *Wood*, 640! Pietermaritzburg, *Wilms*, 2265! Riet Vlei, *Fry in Herb. Galpin*, 2722! Alexandria Dist., Dumisa, *Rudatis*, 445! Highland Station, *Kuntze*! Nottingham, *Buchanan*, 143! Klip River, *Sutherland*! without locality, *Hb. Swartz*! *Gerrard*, 373!

A. peduncularis, as treated by one of us in the Flora of Tropical Africa, has been accepted in the sense in which the species was presented by Müller in DC. Prodr. xv. ii. 846, in 1866. In reality there are to the north of the tropic two distinct forms; one of these, confined to Rhodesia, is the plant treated by Müller as *A. peduncularis*, α, *caperonioides* (= *A. caperonioides*, Baill.), the other, met with in Nyasaland and Gazaland, being the plant treated by Müller as *A. peduncularis*, ε, *punctata* (= *A. punctata*, Meisn.). The abundant material of both now available shows that it is better to treat them as distinct species.

The variety here recognised, var. *crassa*, though usually readily separable from *A. peduncularis* proper, is, as Meisner pointed out when he originally described it, not really specifically distinct. Müller made an endeavour to distinguish the *A. peduncularis* issued but not described by E. Meyer in 1843, from the *A. peduncularis* described by Meisner in 1845. But there is no justification for Müller's belief that these two differ. It is true that *A. peduncularis*, E. Mey., itself, is rare in Natal, and that in that colony its place is largely taken by var. *crassa*. But it so happens that the portion of Krauss 377, on which in 1845 Meisner based his description of *A. peduncularis*, is not separable from the plant issued by E. Meyer in 1843 under the same name.

14. **Acalypha glandulifolia**, *Buching. ex Meisn. apud Krauss in Flora*, xxviii. 83 (1845); *Sond. in Linnaea*, xxiii. 116 (1850); *Walp. Ann.* iii. 367 (1852); *Baill. Adansonia*, iii. 157 (1863).—*A. peduncularis*, var. *glandulifolia*, Müll. Arg. in Linnaea, xxxiv. 28 (1865), *et in DC. Prodr.* xv. ii. 846 (1866).

Natal: near Durban, *Krauss*! *Gueinzius*, 170! *Gerrard*, 520! *Sutherland*! *Wood*, 1416 partly! Attercliffe, 800 ft., *Sanderson*, 298! Inanda, 1800 ft., *Wood*, 48 partly! 694! Indwedwe, *Wood*, 1054! Alexandra Dist., Dumisa, 2000–2500 ft., *Rudatis*, 96! 743! 744!

A well-marked species, within which Sonder suggested the recognition of two distinct forms, one with pilose almost simple, the other with glabrous more branching stems. The more ample material now available shows that this subdivision is not essential.

15. **Acalypha entumenica**, *Prain*. Herbacea, prostrata, 3–4·5 dm. longa, simplex, dense foliosa, caulis densius patente setulosus. *Folia* subsessilia, membranacea, ovato-lanceolata vel lanceolata, acuta, basi cuneata vel rotundata, margine distincte serrata, dentibus singulis aut glandulam capitatam stipitatam aut setam basi bulbosam suffulcientibus, 1·25–2·5 cm. longa, 0·5–0·6 cm. lata, utrinque densius pilis basi bulbosis setulosa, et saepe glandulis stipitatis parcius obsita; petiolus setulosus, 1·5 mm. longus; stipulae minimae, membranaceae, caducae. *Inflorescentiae* 1-sexuales, dioicae. *Spicae* maris haud visae. *Spicae* femineae solitariae, terminales, sessiles, demum 2·5–4 cm. longae; bracteae subsessiles, foliaceae, late ovatae vel suborbiculares, acutae, basi rotundatae, margine serratae, 0·6–0·8 cm. longae, 0·8–1·25 cm. latae, margine glandulosae extra densius setulosae glandulosaeque. *Semina* subglobosa.

Zululand: Entumeni, 2000 ft., *Wood*, 3737!

A species most nearly allied to *A. glandulifolia*, Buching., but readily distinguished by its shorter wider female bracts with stalked glands, and by its strigose foliage.

16. **Acalypha depressinervia**, *K. Schum. in Just, Bot. Jahresber.* xxvi. i. 348 (1901).—*A. peduncularis*, var. *angustata*, Müll. Arg. in Linnaea xxxiv. 28 (1865) et in DC. Prodr. xv. ii. 847 (1866), pro parte minima et quoad sp. Wahlberg. tantum; nec *A. angustata*, Sond. *A. Schinzii*, Pax in Bull. Herb. Boiss. vi. 734 (1898), excl. var. *denticulata*. *A. Oweniae*, Harv. Mss. in Herb. T. C. D. *Ricinocarpus depressinervius*, O. Kuntze, Rev. Gen. Pl. iii. ii. 291 (1893).

Transvaal: Macalisberg, *Wahlberg*! Carolina Dist.; Billy's Vlei, *Mitchell*! Houtbosch, *Rehmann*, 5914! Barberton; Saddleback Mountain, 4500–5000 ft., *Galpin*, 638! 1120! near Barberton, and between Komati River Drift and Crocodile River, *Bolus*, 9776!

Orange River Colony: Bester's Vlei near Witziesbock, 5500 ft., *Flanagan*, 1922! Harrismith, *Sankey* 237!

Basutoland: without precise locality, *Cooper*, 3577!

Natal: near Durban, *Miss Owen*! *Sanderson*! *Wood*, 1416 partly! Inanda, *Wood*, 298! Tugela, *Gerrard*, 618! Near Krantzkloof, 1500 ft., *Schlechter*, 3186! Camperdown, *Rehmann*, 7793! Dalton, 3300 ft., *Rudatis*, 15! between Greytown and Newcastle, *Rudatis*, 2260! Mooi River, 4000–5000 ft., *O. Kuntze*! *Wood*, 3766!

A very distinct species at once distinguishable from every other South African *Acalypha* with subsessile leaves by the entire leaf margins.

17. **Acalypha angustata**, *Sond. in Linnaea* xxiii. 115 (1850); *Walp. Ann.* iii. 367 (1852); *Baill. Adansonia* iii. 157 (1863).—*A. angustata*, var. *glabra*, Sond. l.c. 116 (1850). *A. peduncularis*, var.

angustata, Müll. Arg. in Linnaea xxxiv. 28 (1865) et in DC. Prodr. xv. ii. 847 (1866) pro parte maxima sed sp. Wahlb. exclus. *A. Schinzii*, var. *denticulata*, Pax in Bull. Herb. Boiss. vi. 734 (1898).

Transvaal: Macalisberg, *Burke*, 349! *Zeyher* 1518! Maquasi Mountains, *Nelson*, 231! Pretoria; above Aapies Poort, *Rehmann*, 4284! Derde Poort, *Leendertz*, 363 mainly! Waterval Onder, *Jenkins*, 6735! Elandspruitsberg, *Schlechter*! near Lydenberg, *Wilms*, 1322! 1327! near Johannesberg, *Gilfillan in Herb. Galpin*, 6071! 6172! *Marloth*, 3669! Witbank, *Rogers*, 2545! Marico, *Holub*! Derby Station, 5300 ft., *Burtt Davy*, 7165! Paardeville, near Zeerust, 4500 ft., *Burtt Davy*, 7192! Bethal, *Burtt Davy*, 3834! 5602! Heidelberg, *Leendertz*, 2582! Uitgevallen, *Burtt Davy*, 9150! Krugersdorp, *Holder*, 4548! Ermelo, *Bester*, 2164 partly! Irene, *Burtt Davy*, 747! Hartebeestenek, *Burtt Davy*, 769! without precise locality, *McLea*!

Natal: near Durban, *Gueinzius*, 171! *Gerrard* 519! near Maritzburg, *Wilms*, 2262! Riet Vlei, at Greenwich Farm, *Fry in Herb. Galpin*, 2721!

The two varieties originally distinguished by Sonder can be readily separated in their extreme conditions, but they are connected by a regular gradation of forms, intermediate as regards pubescence, and their continued recognition serves no useful purpose.

18. **Acalypha caperonioides**, *Baill. Adansonia* iii. 157 (1863).—*A. peduncularis*, var. *glabrata*, Sond. in Linnaea xxiii. 115 (1850). *A. Zeyheri*, var. *glabrata*, Müll. Arg. in Linnaea xxxiv. 29 (1865) et in DC. Prodr. xv. ii. 847 (1866) quoad syn. Sond. sed spp. citat. exclud. *A. peduncularis*, var. *caperonioides*, Müll. Arg. in DC. Prodr. xv. ii. 846 (1866). *A. peduncularis*, Hutchinson in Dyer Fl. Trop. Afr. vi. i. 884 (1912) quoad spp. rhodesica; nec E. Mey.

Rhodesia: Myanga; Manika, 6000–7000 ft., *Cecil*, 179! 182! between Umtali and Myanga Mountains, *Cecil*, 167! Salisbury, *Cecil*, 68! *Engler*, 3052! *Rogers*, 4003! Gwelo, *Gardner*, 33! Bulawayo, *Eyler & Johnson*, 1153!

Transvaal: Macalisberg, *Burke*, 83! 153! *Zeyher*, 15, 21! Elandspruitsberg, *Schlechter*! Lydenberg, *Wilms*, 1324! 1328! 1329! Heidelberg, *Wilms*, 1322! *Leendertz*, 2583! Waterval Boven, *Rogers*, 24! Johannesberg, *Marloth*, 3866! Pretoria and vicinity, *Engler*, 2833! *Burtt Davy*, 1988! Road to Wonderboom, *Leendertz*, 321! Wonderboompoort, *Rehmann*, 4553! 4554! between Potchefstroom and Rustenburg, *Roe*! Pinedene, Irene, 4800 ft., *Burtt Davy*, 2305! Ermelo, *Burtt Davy*, 5485! *Bester*, 2164 partly! Marico, Koster, 5300 ft., *Burtt Davy* 7171! Modderfontein, *Miss Haagner*! Barberton, *Miss Ivy Thorncroft*, 30!

Orange River Colony: Parys, *Rogers*, 707!

Var. **Galpini**, *Prain*; a typo foliis membranaceis, utrinque dense persistenter pilis elongatis basi bulbosis vestitis differt.

Transvaal: Barberton, 4000 ft., *Galpin*, 1106!

This variety, of which only female specimens are known, may prove a distinct species.

19. **Acalypha punctata**, *Meisn. apud Krauss in Flora*, xxviii. 83 (1845).—*A. peduncularis*, var. *punctata*, Müll. Arg. in Flora, xxxiv. 28 (1865) et in DC. Prodr. xv. ii. 846 (1866). *A. peduncularis*, Pax in Engl. Pfl. Ost.-Afr. C. 239 (1895) partim; Hutchinson in

Dyer, Fl. Trop. Afr. vi. i. 884 partim et quoad spp. gaz. et nyas. tantum (1912); nec E. Mey. *Ricinocarpus pedunculatus*, var. *punctatus*, O. Kuntze, Rev. Gen. Pl. iii. ii. 292 (1893).

Orange River Colony: Bester's Vlei, Witzieshoek, 5700 ft., *Bolus*, 8251! without precise locality *Rogers*!

Transvaal: Barberton, 2500–4000 ft., *Galpin*, 429! Mac Mac Creek, *Mudd*!

Transkei: Kentani, 1200 ft., *Miss Pegler*, 65 partly!

Tembuland: Umtata, *Miss Mason* (icon.)!

Pondoland: Fort Grosvenor, *Bachmann*, 785! 789! 794!

Griqualand East: near Kokstad, 3800 ft., *Tyson* 1107! Clydesdale, 2500 ft., *Tyson*, 3107!

Natal: near Durban, *Krauss*, 377 mainly! *Verreaux*! *Gueinzius*! *Wood*! Bellair, 220 ft., *Schlechter*, 3105! Inanda, 1800 ft., *Wood*, 296! 697! Attercliffe, 800 ft., *Sanderson*, 344! Camperdown, 2000 ft., *Wood*, 864! 4106! Friedenau, 2000 ft., *Rudatis*, 779! 780! Dumisa, Fairfield, 2700 ft., *Rudatis*, 1201! Ladysmith, 3300 ft., *Kuntze*! Klip River, 3500–4000 ft., *Sutherland*! Lidgetten, 3900 ft., *Wood*, 6201!

Zululand: without precise locality, *Gerrard & Mc Ken*, 1167!

Gazaland: Upper Buzi, 3000 ft., *Swynnerton* 383!

Nyasaland: Zomba Plateau, 5000–6000 ft., *Whyte*!

Var. longifolia, *Prain*; a typo foliis lanceolatis vel lineari-lanceolatis acutis, nec ovato-lanceolatis vel ovatis inferioribus obtusis, differt.—*A. longifolia*, E. Meyer Mss. in Herb. Lübeck.

Transvaal: Lydenburg; Witklip, 4800 ft., *Burtt Davy*, 7264! Barberton; Fairview Farm, *Burtt Davy*, 4080! Pretoria; Aapies River, *Rehmann*, 4016! 4283! *Leendertz*, 1003! *Scott Elliot* 1449! Derde Poort, *Leendertz*, 4016! 363 partly!

Transkei: between the Gekua River and the Bashee River, *Drège*, 5380!

Tembuland: Bazeia, 2000 ft., *Baur*, 269!

Pondoland: Fort Grosvenor, *Bachmann*, 788!

Griqualand East: near Kokstad, 4800 ft., *Tyson*, 1231!

Var. Rogersii, *Prain*; a typo necnon a varietate praecedenti foliis duplo brevioribus omnibus obtusis differt.

Transvaal: Waterval Boven, 4800 ft., *Rogers*, 288! Swaziland, *Stewart* (*Hb. Transv.* 8917)! Barberton; Saddleback Mt., 4500 ft., *Galpin*, 1121! Shilouvane, *Junod*, 1325!

The form here described as var. *longifolia*, though in extreme cases very distinct from typical *A. punctata*, passes insensibly into the type. Sometimes mistaken in the field for *A. angustata*, Sond., it is readily distinguishable by its different female bracts. Like *A. peduncularis*, *A. punctata* var. *longifolia* is sometimes monoecious, with axillary male spikes and a terminal female spike on the same plant. Occasionally too the foliage is variegated as in *Codiaeum*.

The form here described as var. *Rogersii*, is almost certain to prove, when fuller material is available, deserving of recognition as a distinct species.

20. **Acalypha Wilmsii**, *Pax Mss. in Herb. Berol.* Herbacea, erecta, 3–6 dm. alta, parce ramosa; caulis pubescens vel patenter setulosus. *Folia* subsessilia, membranacea, adulta firmula, ovata vel ovato-lanceolata, ima obtusa, cetera saepissima acuta, bas

rotundata vel parum cordata, margine breviter dentata, 5–7·5 cm. longa, 4–5 cm. lata, utrinque praesertim secus nervos pubescentia vel strigosa, et secus venas graciliores glandulis longe stipitatis obsita ; petiolus 2 mm. longus, setulosus ; stipulae 3 mm. longae, lanceolatae, persistentes. *Inflorescentiae* 1-sexuales, dioicae. *Spicae* maris axillares, solitariae, pedunculatae ; pedunculi 2·5–4 cm. longi, pubescentes vel dense setulosi glandulosique ; pars florifera cylindrica, gracilior, densa, 2·5–3 cm. longa ; alabastra molliter pubescentia vel setulosa. *Spicae* femineae solitariae, terminales, sessiles, primum 2·5 cm. demum 7 cm. longae ; bracteae 1-florae, subsessiles, foliaceae, late ovato-cordatae, acutae, 1·75–2 cm. longae, 2·5–3 cm. latae, margine dentatae dentibus triangularibus brevibus, dense pubescentes vel setulosae et glandulis longe stipitatis obsitae. *Sepala* 3, acuta, pubescentia glandulosaque. *Ovarium* distincte 3-lobum, molliter pubescens et glandulosum ; styli 3, basi cuneati, superne laciniati. *Semina* subglobosa.—*Ricinocarpus pedunculatis*, var. *genuinus*, O. Kuntze, Rev. Gen. Pl. iii. ii. 292, nec *R. pedunculatis*, O. Kuntze, l.c. ii. 618. *R. pedunculatis*, var. *Radula*, O. Kuntze, l.c. iii. ii. 292 (1893) nec *Acalypha Radula*, Baker.

Transvaal: Lydenberg ; Spitzkop, *Wilms*, 1326! Crocodile River, *Wilms*, 1330! Paardeplats, *Wilms*, 1331! Ermelo ; *Tennant*, 6807! *Burtt Davy*, 9390! *Leendertz*, 2997! Billy's Vlei, *Burtt Davy*, 9211! Barberton ; Saddleback Mt., 4500–4800 ft., *Galpin*, 1119! 1126!

Pondoland : Fort Grosvenor, *Bachmann*, 787! Griqualand East : Clydesdale, 2500 ft., *Tyson*, 2602! 2603!

Natal : near the Mooi River, 4000 ft., *Wood*, 4103! Highland Station, 5300 ft., *Kuntze*! Van Reenen's Pass, *Kuntze*!

Review of Acalypha chamaedrifolia.

Müller's treatment of the West Indian *A. chamaedrifolia* is somewhat on a par with that accorded to *A. pedunculatis*, and we have felt constrained to re-establish most of the species reduced by him as varieties to that species.

Four of these, his var. *pendula* (*A. pendula*, Wright), var. *glechomaefolia* (*A. glechomaefolia*, A. Rich.), var. *nana* (*A. nana*, Griseb.) and var. *genuina* (*A. chamaedrifolia*, emend.) are shown in our Plate figs. 1, 2, 3 and 4 respectively, and from these drawings some idea of Müller's views of this group may be gained. Except in the case of var. *genuina*, the figures have been prepared from the actual types, which are at Kew, and we have seen no intermediate forms which in any way link them up. *A. fissa* (*A. chamaedrifolia*, var. *fissa*, Müll. Arg.), for which there was scarcely space on the plate, is perhaps the most easily recognised of the group, on account of the stems rooting at the nodes, the shape and toothing of the leaves, and the deeply 5-lobed female bracts which are most closely approached by those of *A. glechomaefolia* (fig. 2a).

Below is given the synonymy and a short description of each species indicating the more salient features by which they may be distinguished.

A. chamaedrifolia, *Müll. Arg. in DC. Prodr.*, xv. pt. ii. 879 (emend.); Duss in Ann. Inst. Colon. Marseill. vol. iii. p. 35; Urban, Symb. Antill. vol. iv. p. 347.

Croton chamaedrifolius, Lam. Encycl. vol. ii. p. 215 (1786).

Acalypha reptans, Swartz, Prodr. p. 99 (1788), et Flor. Ind. occid. vol. ii. p. 1170; Willd. Sp. Pl. vol. iv. p. 523; Griseb. Flor. Brit. West Ind. p. 48; Duss, l.c.

A. corchorifolia, Willd. l.c. 524 (1805); Chapman, Fl. of the Southern Unit. States, p. 406.

A. adscendens, Hornem. Hort. Hafn. Suppl. 108 (1819).

A. reptans, var. *genuina*, Müll. Arg. in Linnaea, vol. xxxiv. p. 48, excl. syn. Klotzsch. *A. reptans*, var. *glechomaefolia*, Müll. Arg. l.c., partly, as to *Wright*, 572.

A. patens, Müll. Arg. in DC. Prodr. vol. xv. pt. ii. 848 (1866). *A. chamaedrifolia*, var. *genuina*, Müll. Arg. in DC. l.c. 879, excl. syn. Klotzsch, and var. *glechomaefolia*, Müll. Arg. l.c., partly, as to *Wright*, 572.

Ricinocarpus chamaedrifolius, O. Ktze, Rev. Gen. Pl. vol. ii. p. 617 (1891). ——Sloan, Hist. Jam. vol. i. t. 82, fig. 3; Plumier, Plant. Amer. t. 172, fig. 2.

Caules patentes vel suberecti, numerosi, simplices, rhizomate lignoso horizontale orti; folia heteromorpha, inferiora minora, suborbicularia, superiora majora, oblongo-ovata vel oblongo-lanceolata, basi rotundata vel truncata, 1–3 cm. longa, plerumque glabra vel fere glabra; inflorescentiae bisexuales, et terminales et in foliorum superiorum axillis aggregati, inferne ♀, superne ♂; bractea ♀ et pistillum ut in fig. 4a et 4b.

Cuba: Eastern district, *Wright*, 572! 1672! near Monte Verde, *Wright*, 1426! Santa Clara Province; Cieneguita, Cienfuegos district, *Combs*, 140! Haland Province; Fecha, *Wilson*, 1117!

Isle of Pines: near Nueva Gerona, *Curtiss*, 481!

Jamaica: without precise locality, *Wright in Herb Forsyth*! *Grisebach*, 423! St. Andrews, *Mc Nab*!

San Domingo: *Schomburgk*, 119!

St. Thomas: Cowells Hill, *Eggers*, 118!

Guadeloupe: *Duchassaing*!

Occurs also in S. E. Florida, and according to Urban in the islands of Porto Rico, Hispaniola and St. Croix.

We have not seen *A. microphylla*, Klotzsch, from N.W. Mexico, reduced to this species by Müller, but from the description it can scarcely be the same. The leaves are described as being 4–6 in. long and 3–4 in. broad, and the male spikes axillary and the female terminal.

A. pendula, *Wright ex Griseb. in Goett. Nachr.* 1865, 176.

A. chamaedrifolia, var. *pendula*, Müll. Arg. in DC. Prodr. vol. xv. pt. ii. p. 879 (1866).

Caules lapidibus penduli (*Wright*); radix non visa; folia inter se similia, ovata vel oblongo-ovata, basi truncata vel leviter cordata, 1·2–4 cm. longa, 1–2·3 cm. lata, marginibus non incrassatis, utrinque molliter tomentosa, demum pubescentia; inflorescentiae et axillares et terminales; illae e floribus ♀ 1 vel 2 sessilibus constitutae; hae

androgynae, inferne ♀, superne ♂ ; bractea ♀ et pistillum ut in fig. 1a et b.

Cuba : La Calalina, *Wright*, 1981 !

A. glechomaefolia, *A. Rich. Fl. Cub. Fanerog.*, ii. 205 (1853).

A. reptans, var. *glechomaefolia*, Müll. Arg. in Linnaea, vol. xxxiv. p. 48, excl. specim. *Wright*, 572.

A. chamaedrifolia, var. *glechomaefolia*, Müll. Arg. in DC. Prodr. vol. xv. pt. ii. p. 879, excl. specim. *Wright*, 572.

Caules rhizomate prostrati, e nodis inferioribus radicantes ; folia inter se similia, orbicularia, basi alte cordata, grosse crenata, 8–10 mm. diametro, margine non incrassata, utrinque pubescentia et supra parce setosa ; inflorescentiae terminales, inferne ♀, superne ♂ ; bractea ♀ ut in fig. 2a ; ovarium pilosum.

Cuba : without precise locality, *Ramon de la Sagra*, 126 !

San Domingo : Jamoa, *Eggers*, 2637 ! without precise locality, *Schomburgk* !

Müller quotes *Wright*, 572, from Cuba as being this species, but it seems to us to be a small-leaved form of *A. chamaedrifolia*.

A. fissa, *Hutchinson*.

A. chamaedrifolia, var. *fissa*, Müll. Arg. in DC. Prodr. vol. xv. pt. ii. p. 879.

Caules prostrati, nodis radicantes, pilis reflexis pubescentes, internodiis 1–2·5 cm. longis. *Folia* inter se similia, ovata, basi truncata vel rotundata, 8–16 mm. longa, 8–13 mm. lata, grosse 10–12 crenata, membranacea, supra setoso-pilosa, infra patente pubescentia, basi trinervia, nervis infra prominulis ; petioli 0·3–1·5 cm. longi, pubescentes. *Flores* monoici. *Inflorescentiae* et axillares et terminales, axillares ♀ breves, terminales androgynae, inferne ♀, superne ♂. *Gemmae* ♂ obtuse quadrangulares, glabrae. *Bracteae* ♀ ambitu transverse oblongae, 3·5 cm. latae, alte 5–lobatae, submembranaceae, extra pilosae, lobis ovatis subacutis 1 mm. longis. *Sepala* parva, ciliata. *Ovarium* subglobosum, longe pilosum ; styli graciles, tenuiter laciniati.

Cuba : without precise locality, *Wright*, 1983 !

A. nana, *Griseb. in Goett. Nachr.* 1865, 176, *nomen*.

A. pygmaea, Griseb. l. c., non A. Rich., fide Müll. Arg.

A. chamaedrifolia, var. *nana*, Müll. Arg. in DC. Prodr. vol. xv. pt. ii. p. 880 (1866).

Caules prostrati, rhizomate lignoso erecto apice patentes ; folia inter se similia, orbicularia vel ovato-orbicularia, basi rotundata, 2–4 mm. diametro, marginibus cartilagine incrassatis, supra parce setoso-pilosa ; inflorescentiae unisexuales, ♂ non visae ; inflorescentia ♀ uniflora, flore terminali ; bractea ♀ et pistillum ut in fig. 3a et 3b.

Cuba : without precise locality, *Wright*, 1984 !

Apparently a very distinct species.

A. pygmaea, *A. Rich. Fl. Cub. Fanerog.*, iii. 205 (1853).

A. reptans, var. *pygmaea*, Müll. Arg. in Linnaea, vol. xxxiv. p. 49.

A. chamaedrifolia, var. *pygmaea*, Müll. Arg. in DC. Prodr. vol. xv. pt. ii. 880 (1866).

Caules di usi, e basi ramosi; folia ovata, acuta, basi obtusa (4–6 mm. longa, ex *Müller*), serrata, nervis pubescentibus; inflorescentia brevis, subterminalis, androgyna, inferne floribus 2–3 subsessilibus constituta, superne ♂; bractea ♀ 5-dentata.

Cuba: near the sea, *Ramon de la Sagra* (Herb. Paris).

We have not seen an example of this species, but from the description, an adaptation of which is given above, it is evidently quite distinct and most nearly allied to *A. nana*.

Explanation of Plate.

Fig. 1, shoot of *Acalypha pendula*.
1a, female bract of same.
1b, pistil.

Fig. 2, plant of *A. glechomaefolia*.
2a, female bract of same.

Fig. 3, plant of *A. nana*.
3a, female bract of same.
3b, pistil.

Fig. 4, portion of plant of *A. chamaedrifolia*.
4a, female bract of same.
4b, pistil.

Analyses enlarged.

II.—NEW ORCHIDS: DECADE 39.

381. **Liparis nana**, *Rolfe;* inter species Asiaticas habitu nana, floribus atropurpureis, columna lata et fere recta distinctis.

Herba terrestris, nana, circiter 3·5 cm. alta. *Folia* 3–4, rosulata, patentia, ovato-oblonga, subobtusa, undulata, 2–2·5 cm. longa. *Scapus* circiter 3·5 cm. altus, angulatus; racemus brevis, subcorymbosus. *Bracteae* ovato-lanceolatae, acutae, basi subconcavae, 3–5 mm. longae. *Pedicelli* 7–9 mm. longi. *Flores* purpurei. *Sepala* subpatentia, ovato-oblonga, subacuta, leviter carinata, 6 mm. longa. *Petala* recurva, linearia, acuta, 5 mm. longa. *Labellum* sessile, late cordato-oblongum, apiculatum, conduplicatum, margine denticulatum, 4 mm. longum, per discum late canaliculatum, basi septo transverso nitido instructum. *Columna* oblonga, lata, medio canaliculata, 4 mm. longa, apice breviter bidentata.

Annam.

Sent to Kew for determination by Mr. Gurney Wilson, Glenthorne, Haywards Heath, who remarks that it was found growing on an imported plant of *Cymbidium insigne*, Rolfe. It is a very small plant, with dark purple flowers, and somewhat anomalous in its very broad nearly straight column. Its precise affinity remains at present uncertain.

382. **Cirrhopetalum miniatum**, *Rolfe*; a *C. gracillimo*, Rolfe, scapis brevioribus, floribus majoribus, miniatis, sepalo postico et petalis flavo-pilosis valde differt.

Pseudobulbi tetragono-ovoidei, rugosi, circiter 1·2 cm. longi, 1 cm. lati, monophylli. *Folia* sessilia, lanceolato-oblonga, subacuta, coriacea, circiter 7 cm. longa, 1·5 cm. lata. *Scapi* graciles, 10 cm. longi, basi vaginis angustis paucis obtecti, apice circiter 8-flori. *Bracteae* lineari-lanceolatae, subacutae, 3–4 mm. longae. *Pedicelli* subumbellati, graciles, circiter 8 mm. longi. *Flores* elongati, miniati, petalis et sepalo postico marginibus pilis flavis ornatis. *Sepalum* posticum ovatum, acuminato-aristatum, valde concavum, circiter 8 mm. longum, marginibus longe pilosis; sepala lateralia basi connata, anguste lineari-oblonga, apice longissime caudato-acuminata et libera, 7–9 cm. longa. *Petala* oblique-ovata, aristato-acuminata, vix concava, 5 mm. longa, marginibus longe pilosis. *Labellum* recurvum, oblongum, subacutum, carnosum, 2·5 mm. longum. *Columna* lata, oblonga, 2 mm. longa; dentes graciles, subulati, 1 mm. longi.

Annam.

A remarkable species which flowered in the Royal Botanic Gardens, Glasnevin, in September, 1910. Sir F. W. Moore states that it was purchased from Messrs. Sander and Sons as having been imported with *Dendrobium Bronckartii*, De Wildem. The flowers are vermilion-coloured, with bright yellow hairs on the margins of the petals and dorsal sepal, the anther-case yellow, and the teeth of the column whitish.

383. **Calanthe violacea**, *Rolfe; C. Masucae*, *Lindl.*, affinis, sed bracteis angustioribus et recurvis, labelli lobis lateralibus lobo intermedio minoribus et divaricatis differt.

Herba terrestris. *Folia* radicalia petiolata; limbus late ellipticolanceolatus, breviter et abrupte acuminatus, plicatus, submembranaceus, circiter 25 cm. longus, 10 cm. latus. *Scapus* erectus, circiter 30 cm. longus, subvelutinus; racemus brevis, multiflorus. *Bracteae* oblongo-lanceolatae, acutae, recurvae, 1–1·8 cm. longae, purpureosuffusae. *Pedicelli* 2·5–3 cm. longi, puberuli, purpurei. *Flores* speciosi, lilacino-purpurei, labello violaceo-purpureo. *Sepala* et *petala* patentia vel recurva, elliptico-lanceolata, acuta, 1·5–1·8 cm. longa. *Labellum* columnae adnatum, lamina 3-loba, 1·2 cm. longa; lobus intermedius late triangulari-obcordatus, 1·3 cm. latus, apice breviter bilobus; lobi laterales divaricati, elliptico-oblongi, subobtusi, circiter 4 mm. longi; discus per medium carinatus, basi prominente verrucosus; calcar cylindricum, incurvum, circiter 3 cm. longum. *Columna* lata, 5 mm. longa.

Madagascar.

Imported by Messrs. Charlesworth & Co., Haywards Heath, and flowered in their nursery in January, 1912. The sepals and petals are light purple, and the lip violet-purple, becoming brownish as it fades, while the crest of the lip is yellowish brown.

384. **Epidendrum (Nanodes) congestum**, *Rolfe;* ab *E. discolore*, Benth., floribus minoribus pallide viridibus differt.

Herba epiphytica, nana, 3–4 cm. alta. *Folia* disticha, patentia, ovato-oblonga, obtusa, 1·5–2·5 cm. longa, 7–9 mm. lata, coriacea, carinata, margine revoluta et minutissime denticulata. *Bracteae* imbricatae, conduplicatae, ovatae, obtusae, minutissime denticulatae, circiter 1 cm. longae. *Pedicelli* 5–6 mm. longi. *Flores* terminales,

2–3, ad apices ramorum congesti, subcarnosi. *Sepalum* posticum reflexum, ovatum, subacutum, 1 cm. longum; sepala lateralia patentia, oblongo-lanceolata, acuta, valide carinata, concava, 1 cm. longa. *Petala* lanceolata, acuta, 9 mm. longa, apice subrecurva. *Labellum* columnae adnatum, limbus cordato-ovatus, acutus, 5–6 mm. longus. *Columna* lata, circiter 6 mm. longa.

Costa Rica.

Flowered in the Royal Botanic Gardens, Glasnevin, in January, 1911. The flowers are pale green, with an emerald green lip, and the column suffused and mottled with red purple.

385. **Eulophia Macowani**, *Rolfe* in Dyer Fl. Cap. vol. v. sect. iii. p. 38, anglice; affinis *E. Haygarthii*, Rolfe, foliis angustioribus, petalis latioribus subobtusis et labello breviter vel obscure trilobo differt.

Rhizoma validum; nodi incrassati. *Folia* 5–7, fasciculata, elongato-linearia vel anguste ensiformia, acuta, crebre venosa, recurva vel suberecta, 15–30 cm. longa, basi late vaginata. *Scapi* laterales, 30–45 cm. longi, vaginis lanceolatis imbricatis obtecti; racemi 10–15 cm. longi, saepe laxi, multiflori. *Bracteae* lanceolatae, acuminatae, 1·5–2·5 cm. longae. *Pedicelli* circiter 2 cm. longi. *Flores* majusculi, flavi. *Sepala* oblongo-lanceolata, acuta, circiter 2 cm. longa. *Petala* ovata vel elliptico-ovata, acuta vel subacuta, sepalis paullo longiora et circiter triplo latiora. *Labellum* late ellipticum, petalis brevius, breviter vel obscure triloba; lobi laterales parvi, late oblongi vel rotundati; lobus intermedius late ellipticus vel suborbicularis; discus carinis 3 papillosis vel cristatis instructus, basi interdum 5-carinatus; calcar clavatum, vel oblongum, saepe incurvum, 4–6 mm. longum. *Columna* late oblonga, 4–6 mm. longa. *Capsula* late elliptica, circiter 4 cm. longa.

S. Africa. Kasonga River, *MacOwan*, 184; Kowie River mouth, *Hutton in MacOwan & Bolus Herb. Norm. Austr.-Afr.*, 1215.

386. **Eulophia acuminata**, *Rolfe* in Dyer Fl. Cap. vol. v. sect. iii. p. 39, anglice; ab *E. calanthoides*, Schlechter, sepalis petalisque multo angustioribus et acuminatis differt.

Folia non vidi. *Scapi* validi, 30–60 cm. longi, vaginis numerosis lanceolatis imbricatis obtecti; racemus 10–20 cm. longus, multiflorus. *Bracteae* lineari-lanceolatae, acuminatae, 2·5–4 cm. longae. *Pedicelli* circiter 2 cm. longi. *Flores* majusculi, flavi. *Sepala* oblongo-lanceolata, acuminatissima, 2·5–3 cm. longa. *Petala* elliptico-oblonga, acuminatissima, sepalis paullo longiora et duplo latiora *Labellum* breviter trilobum, petalis brevius; lobi laterales breves obtusi vel rotundati, venis numerosis radiatis; lobus intermedius elliptico-oblongus, apiculatus; discus carinis 3 verrucosis instructus, carinis apice tenuibus et puberulis; calcar oblongum, obtusum, curvatum, 4 mm. longum. *Columna* clavata, lata, 4 mm. longa. *E. calanthoides*, Bolus, Ic. Orch. Austr.-Afr. i. sub t. 51, ex parte (non Schlechter).

S. Africa. Natal: near Estcourt, *Wood*, 3428.

387. **Eulophia Allisoni**, *Rolfe* in Dyer Fl. Cap. vol. v. sect. iii. p. 39, anglice; affinis *E. calanthoides*, Schlechter, sed floribus minoribus et labello obscure trilobo differt.

Folia 5–7, fasciculata, ensiformia, acuta, plicata (immatura), circiter 10 cm. longa, 8–12 mm. lata. *Scapi* crassiusculi, circiter 75 cm. alti, vaginis paucis laxis obtecti; racemi 15 cm. longi, multiflori. *Bracteae* lineari-lanceolatae, acuminatae, 2–2·5 cm. longae. *Pedicelli* circiter 1·3 cm. longi. *Flores* majusculi, pallide flavi, labelli lobis lateralibus venis rufis ornatis. *Sepala* lineari-lanceolata, acuminatissima, 2–2·5 cm. longa. *Petala* elliptico-oblonga, subacuta, sepalis brevioribus et triplo longioribus. *Labellum* subintegrum vel obscure trilobum, ellipticum, apiculatum, petalis aequilongum et paullo latius; lobi laterales brevissimi vel subobsoleti; discus basi carinis 5 crassiusculis obtectus, prope apicem venis numerosis laevibus vel puberulis ornatus; calcar clavatum, circiter 3 mm. longum. *Columna* clavata, 6 mm. longa. *E. calanthoides*, Bolus Ic. Orch. Austr.-Afr. i. t. 51, ex parte.

S. Africa. Without precise locality, *Allison*; Albany Div., near Grahamstown, *Todd*.

388. **Eulophia Bakeri**, *Rolfe* in Dyer Fl. Cap. vol. v. sect. iii. p. 40, anglice; affinis *E. calanthoides*, Schlechter, petalis latioribus, labelli lobo intermedio brevi et disci carinis basi verrucosis apice longe fimbriatis differt.

Rhizoma non vidi. *Folia* elongato-lanceolata, acuta, basi attenuata, circiter 20 cm. longa, 2 cm. lata. *Scapus* circiter 30 cm. longus; racemus 6–8-florus. *Flores* carnei. *Sepala* oblongo-lanceolata, acuta vel breviter acuminata, circiter 2 cm. longa. *Petala* ovato-elliptica, minute apiculata, sepalis paullo longiora et duplo latiora. *Labellum* ovato-ellipticum, petalis brevius, apice obtusum vel rotundatum; lobi laterales angusti, apice obtusi vel rotundati; lobus intermedius late ellipticus vel suborbicularis; discus carinis 5–7 apice fimbriatis basi verrucosis instructus; calcar oblongum, subobtusum, paullo curvatum, 4 mm. longum. *Columna* late oblonga, 6–7 mm. longa.

S. Africa. Transvaal: high ridge outside Johannesburg, 1500 m., *Baker*.

Described from rather imperfect material.

389. **Eulophia Rehmanni**, *Rolfe* in Dyer Fl. Cap. vol. v. sect. iii. p. 41, anglice; affinis *E. Bakeri*, Rolfe, labello late ovato petalis multo parviore et disci carinis minute crenulatis differt.

Rhizoma non vidi. *Folia* fasciculata, 6–8, patentia, linear-oblonga, acuminata, 5–7 nervia, basi attenuata et conduplicata, 10–15 cm. longa, 2–3 cm. lata, basi vaginis 2–3 brevibus obtecta. *Scapi* erecti, circiter 45 cm. longi, vaginis 3–4 distantibus obtecti; racemi densiusculi, 8–12-flori. *Bracteae* lineari-lanceolatae, acuminatae, 2–2·5 cm. longae. *Pedicelli* circiter 1·5 cm. longi. *Flores* majusculi. *Sepala* lanceolata, acuminata, 2 cm. longa. *Petala* elliptico-ovata, subobtusa, sepalis paullo longiora et triplo latiora. *Labellum* ovatum, trilobum, petalis brevius et angustius; lobi laterales late rotundati, breves; lobus intermedius ovatus, subacutus; discus basi carinis numerosis approximatis crenulatis instructus; calcar gracile, clavatum, 6 mm. longum. *Columna* lata, 4–5 mm. longa.

S. Africa. Transvaal: Houtbosch, *Rehmann*, 5845.

390. **Eulophia latipetala**, *Rolfe* in Dyer Fl. Cap. vol. v. sect. iii. p. 41, anglice ; species distinctissima, a praecedente foliis et petalis multo latioribus facile distinguenda.

Folia fasciculata, 5–7, late lineari-oblonga, attenuata, 5–7-nervia, basi conduplicata, 10–30 cm. longa, 2·5–4 cm. lata, basi vaginis 2–3 brevibus obtecta. *Scapi* erecti, crassiusculi, 30 cm. longi, basi vaginis numerosis latis imbricatis obtecti ; racemi desiusculi, 6–12-flori. *Bracteae* lineari-lanceolatae, acuminatae, 2–2·5 cm. longae. *Pedicelli* circiter 1·2 cm. longi. *Flores* majusculi. *Sepala* ovato-oblonga, acuta, circiter 2 cm. longa. *Petala* late ovata, subobtusa, 2 cm. longa, circiter 1·2 cm. lata. *Labellum* 2 cm. longum, fere 1·2 cm. latum, trilobum ; lobi laterales late rotundati, abbreviati ; lobus intermedius suborbiculari - oblongus, obtusus ; discus basi carinis 3–5 crassiusculis laevibus instructus ; calcar subconicum, obtusum, abbreviatum. *Columna* lata, 4 mm. longa.

S. Africa. Transvaal : Houtbosch, Pietersburg district, 1740 m., *Bolus*, 10,975.

III.—TEFF.

(*Eragrostis abysinnica*, Schrad.).

Joseph Burtt Davy.

In accordance with a promise made some time since, Mr. J. Burtt Davy, Government Botanist, Union of South Africa, has kindly sent the following article on "Teff" in the Transvaal for publication in the *Kew Bulletin*. Former articles on this valuable grass have appeared in the *Bulletin* for 1887, No. 1, p. 2 ; and for 1894, p. 378.

The wonderful success which has attended the introduction of Teff into the Transvaal, has induced me to write an article in order to draw the attention of other Colonies to this remarkable grass. As it was Kew which introduced Teff to the civilised world, it is fitting that an account of it should appear in the *Kew Bulletin*.

Seed of Teff was obtained from Abyssinia in 1886 by the Royal Botanic Gardens, Kew, and was distributed to various Botanic Gardens and other Institutions in India and the Colonies, including Natal. As a result of this distribution the following reports were received :—

British Guiana :—It was reported to make "an excellent fine hay" and to mature in six or eight weeks from the time of sowing. "For this purpose Teff is well worth cultivating. It is cleaner and brighter-looking than any other grass, and is readily eaten by cattle and horses." (8.)

India :—In 1887 seed was given to the Rajah of Jashpore, and was reported upon favourably ; "the straw or grass is 4 or 4½ ft. in length and smells sweet. The hill people have taken a fancy to the crop" (6). Mr. J. F. Duthie wrote (16) :—"I have a bad

opinion of it as a food-grain, but think better of it as a fodder." Sown in March, the crop was cut in the beginning of May, but sprang up again into a second growth and yielded a cutting of green fodder early in the rains. Sown in July (the rainy season) and cut in the middle of August, the green crop weighed 16,000 lbs., or from 2000 to 3000 lbs. of dried hay, per acre. At a hill station (Arnigadh) "the hay made from the teff was of exceptional good quality and was greedily eaten by the garden bullocks. When it was offered to them they were being fed upon jowar (*i.e.*, kaffir corn) or sorghum stalks, and, as is well-known, these are remarkably sweet, and cattle, when fed upon them, generally refuse other kinds of dry food until they find that the sorghum is not forthcoming. Our garden cattle, however, seemed to prefer the teff-hay to sorghum, as they would not touch the latter until they had devoured the whole of the teff placed before them! The experience gained here during the last year in the cultivation of teff may therefore be summed up as follows :—

"When sown in the dry season it will yield a light crop of grain, and when sown in the rains it yields little or no grain, but produces abundance of green fodder, which may be cured into very palatable hay where the latter is preferred. In my opinion, teff is destined to become the rye-grass of India, and is well worthy of more extended trial on some of the Government fodder reserves" (16).

Australia :—The reports were equally favourable, the value of this plant for fodder purposes being considered exceptionally high. Its chief merits in this respect are the short time it takes to mature and its suitability to thrive in dry, sandy regions, where few other grasses would flourish equally well (8).

Natal :—Mr. J. Medley Wood, Director of the Natal Botanic Garden, Durban, reported in 1887 (4) as follows :—"I received from the Director of the Royal Gardens, Kew, a small bag of seeds of this plant, which is used in Abyssinia for making bread. The seed is very small, and it appeared to me that it would scarcely find favour in Natal as a cereal, though possibly in some parts of the Colony it might be found useful as a fodder plant. I therefore, after having the seed tested, and finding it quite good, distributed it in small packets to persons willing to give it a trial, and hope in "future report to be able to record the results." In 1888 he wrote (5) :—"This will, as I suspected, have no value as a cereal, in Natal, but very favourable reports have been received of it as a quick-growing fodder-grass." Again, in 1889 (15) :—"It was highly thought of as a quickly-growing grass, though as a cereal it proves, as I had suspected, to have no value in Natal. Whether or no the recipients of the seed have thought it of sufficient value to continue its cultivation, I have no information. De Schonburgk says that it stands drought well, and is a good grazing grass."

As a drought-resisting grain crop, for relieving a famine in India, the introduction of Teff does not appear to have been a success. This result and the details contained in the above reports, suggest the possibility that the Teff introduced was the variety known as *Thaf Tseddia*, the quick-growing, rainy-season sort, described by

the missionary Colbeaux (3) as "of very inferior quality, and the flabby cake, or the 'Tabita,' which is produced from its flour, is as disagreeable to chew as if it were mixed with sand." The slow-growing, or *Thaf Hagaiz* variety, is described by the same writer as requiring nearly five months to mature, or two months longer than the other, and as being of superior quality for human food; "its flour is only advantageously used in making 'Tabita,' a kind of large fermented pancake. The 'Tabita' of Thaf is most easily digestible, and has none of the bitterness of some other kinds of grain."

But its failure as a grain-crop for India may be due entirely to other factors. The yields of grain where it was tried, appear to have been usually too small to be profitable. It should be borne in mind, moreover, that in the work of Seed and Plant Introduction and Acclimatisation, success rarely follows first attempts, whereas perseverance, repetition, study of controlling conditions and removal of inhibiting factors often result in subsequent success. The natural conservatism of native races should also be taken into account. A further cause of failure may have been the lack of a well-organised system of co-operation in field experiments on private farms. Observation and experience show that to overcome indifference or conservatism it is not sufficient to maintain demonstration plots on Government Farms or Experiment Stations, nor to issue publications broadcast, nor, even, to "stump the country" lecturing to farmers. New crops are generally taken up first by theorists or men trying to get rich quickly, to whom the advertisements of novelties in the seed-catalogues appeal; such men are often poor farmers and thus make a failure of what otherwise would be a success, the result being that the new crop gets a bad name.

Had I not adopted a system of co-operative experiments with the Transvaal farmers, by which selected farmers, who knew how to grow crops, were induced to try new and promising things, under supervision, Teff would not to-day have been the success that it is. In spite of the favourable reports quoted above it does not appear to have become established either in Australia or India. As already noted, it was introduced into Natal in 1887, and was distributed among twenty farmers, 17 in Natal, 2 in Zululand and one in the Transvaal; though it was reported in 1888 as being "highly thought of as a quickly-growing grass," it failed to acquire the status of a farm crop, and it was not until after its re-introduction in 1903, and by careful fostering, that it became established. But as Mr. Wentworth Sykes has pointed out (11) "it has now certainly come to stay, as witness the hundreds of tons of hay sold locally last year (1910) on the Johannesburg and Pretoria markets, which is but a little of that sold or fed locally."

In the *Bulletin* article on Tropical Fodder-grasses (8) it is stated (p. 375) that "In dry regions not suitable for permanent pastures, the Abyssinian Teff (*Eragrostis abyssinica*) might be grown during the occasional rains and made into hay. This grass will produce a heavy crop of hay in six weeks from the time of sowing. It is very nourishing, and cattle are very fond of it.'

About this time Kew very kindly sent me a little seed to California, where I grew it at the Experiment Station of the College of Agriculture. I was at once impressed with the wealth of hay produced.

But California is a region of winter rains, where Lucerne thrives to perfection, and where Lucerne is therefore the staple forage crop. No one who could grow Lucerne cared anything about putting in an annual hay crop, like Teff; and Lucerne being in the ascendant, no farmer had room or time for it.

When I came to the Transvaal in 1903 I brought with me seeds of the most successful grasses which I had grown at the Experiment Station there, such as Teff and New Zealand Tall-fescue (*Festuca arundinacea*). Most of these did well, and from the start Teff was a great success. In my Annual Report for the season 1903–4, dated 26th October, 1904, I wrote (9):

"Teff (*Eragrostis abyssinica*) is an annual grass of Abyssinia, leafy and fine in quality and 2 to 4 ft. high, seeding heavily; it makes very rapid growth, maturing in 7 or 8 weeks from time of sowing, and if cut before the seed develops, a second crop can be obtained from the same stand; it makes an excellent catch-crop for hay, two successive cuttings being obtainable during the summer on unirrigated land. The plants seed heavily, our yield of seed from a small plot having been at the rate of about ¾ of a ton (1500 lbs.) per acre; the seedlings are not readily scorched by the intense heat of summer, which is a most important point in this climate; its adaptability to our conditions is shown by the way in which 'volunteer' seedlings came up all over our Experiment Grounds, under the most adverse conditions. Stock eat this grass readily, both green and when made into hay. Teff is a most promising plant for further experiment. . . . Seed is now offered by French dealers at about 3*s*. 2*d*. per lb.; it weighs about 63 lbs. per bushel."

Seed harvested from this crop was distributed among selected farmers in different districts of the Transvaal, for trial under ordinary farm conditions and to test its adaptability to different parts of the country. My system was to issue the seed free of all cost to the farmer, who signed a written undertaking to return to me from his crop twice the amount of seed supplied. In the case of failure of his crop this condition was not enforced. The majority of *bona fide* farmers loyally carried out their agreement, and where they desired to retain all the seed for further experiment, they often offered to pay cash for it.

In my report for 1904–05 (p. 248) I wrote:—"Mr. V. L. Robertson, of Amersfoort, reports:—'In this grass [Teff] I think we have struck the desired hay for the High Veld; sown November 6th, it was 3 ft. high in February and ready for cutting for hay; if cut then it would have matured for a second crop of hay in April. Its yields of hay per acre must be tremendous. On account of the soft, thin straw, it dries and cures very quickly. Of all my experiments this has pleased me more than any.'

"The general consensus of opinion is that Teff is a most valuable hay-grass. Under favourable conditions it will mature in two

months from seed; the seed scatters easily and freely, readily producing a volunteer crop. The yield of seed is remarkable heavy [rendering it cheap and easily obtainable]. The fact that the farmers appreciate the crop is practically illustrated by the requests received for permission to retain, and pay cash for, Teff-seed which is due to the Department as a return for the seed originally supplied."

In February, 1905, my then Assistant, Mr. Hugh C. Sampson, B.Sc., writing in the *Transvaal Agricultural Journal* (Vol. iii, p. 547), noted that Teff sown at the Botanical Experiment Station on November 26th, 1904, was cut for seed on February 20th, twelve weeks from sowing, and gave a yield of 10,285 lbs. of green forage per acre, having had only 7·12 inches of rain during the growing period. "Though it has only been cut two days, the roots are already starting new growth for a second cutting."

In my Report for 1905–06 (p. 112) I noted that "out of twenty-two reported co-operative trials all but two were unqualified successes, and the failures were due to locusts and hail; farmers cannot speak too highly of this crop. One of them writes:—'This can no longer be looked upon as an experiment; its success is assured.' The consequent demand for seed is greater than the supply, owing to the fact that nowhere else than in Abyssinia has this become a commercial crop. By next season, however, I expect that all difficulty in this direction will have been overcome, as so much ground is being sown down to Teff this year."

In my Report for 1906–07 (p. 175) my Assistant at that time, Mr. H. Godfrey Mundy, reported that out of 28 co-operative experiments, carried out in all parts of the Transvaal, 21 were entirely successful; in one case a yield of 4 tons of hay per acre being reported. It was also highly spoken of, in several cases, as a smother-crop for weeds. A progressive farmer in the Wakerstroom District wrote: "It is a grand stand-by at the end of the winter and I don't expect to be without it in the future. All stock are fond of it and do well on it if cut before the straw gets strong. I am now selling seed." From the Ermelo District a farmer wrote: "I have grown Teff most successfully and have supplied farmers round about me with over 100 lbs. of seed free!"

During this period, the demand for seed almost exceeded the supply and the price ranged from 1*s.* up to 5*s.* per lb. With increased production, this fell to 9*d.*, 7*d.*, 6*d.*, 5*d.*, and finally 4*d.* During 1911 I had offers of seed from farmers which totalled over 100,000 lbs.; and this year (1912), one farmer alone has produced 60,000 lbs., which he is selling at 4*d.* per lb. in 100 lb. lots or 5*d.* retail.

But although Teff took with the progressive Transvaal farmer, from the start, the hay did not become a commercial article till some years later. As is usually the case with new farm crops, Teff hay did not sell well when first offered. But it was first grown for farm consumption, and only the surplus crop was put on the Johannesburg market. I well remember how disappointed I was at the reports of the earlier sales; they brought no more than ordinary rough veld-bedding, and were in fact bought for the same purpose! But that

was only because the townsman did not know anything about the new hay. Steps were taken to have trial lots tested by large consumers ; but to move a market requires either the whole-time energies of a shrewd business man or some fortuitous accident. I had other things to do, and could not act as Trades Commissioner for the introduction of Teff-hay on to the Johannesburg market! But the accident happened. As far as I can learn the details, they were as follows :—

A farmer having more Teff-hay than he required for the consumption of his stock, decided to sell the surplus, and sent it to the Johannesburg market. As stated above, it did not sell well ; none of the buyers knew the stuff, and it finally went for bedding. This was disappointing and I personally was afraid it might check the spread of the new crop. But I need not have been afraid. Evidently the low price paid the grower, for it was only his surplus, and his own use of the bulk of the crop doubtless paid him well, leaving the surplus for extra profit. He, and others, continued to send small lots, which were also bought for bedding. As bedding, Teff is softer than the ordinary bedding cut from vlei sedges and *Arundinella Eckloni*, and one lot was therefore selected by the buyer for a racing stable, as being superior to the ordinary. Rumour has it that the owner of the stable found that his racers ate their bedding in preference to the hay in their racks! Being an observant man, and realising that the price he had paid for the bedding was much lower than that of Lucerne hay or oat forage, he decided to buy more and feed it. To his surprise (the story goes) his horses not only ate all the Teff-hay, but began to put on condition ; then he bought up all that was put on the market and called for more. Others soon got wind of this, and the price rose. It was not long before it had risen from 1*s.* per bale or £1 per ton till it commanded the same price as Lucerne hay, *i.e.*, 7*s.* 6*d.* per 100 lbs. or £7 10*s.* per Colonial ton.

Once a market was established, the production went up by leaps and bounds ; the markets were soon flooded, and the price fell to a normal figure ; but by this time farmers had learned the value of Teff-hay for consumption on their own farms, and when it did not pay to rail it to market, they fed it. Two years ago I never again expected to see Teff reach a high figure, but the unprecedented drought of the winter of 1912, following a season in which the rainfall (in Pretoria) was 7 inches below the average, has raised the price of hay and fodder so that Teff has again been selling at £7 10*s.* per ton in Johannesburg.

Since the Union of the four South African Colonies, I have distributed seed to the other Provinces of the Union, and am glad to find that it is taking hold in the Orange Free State, Natal and the Eastern Province. A good deal of seed has been sold by Transvaal farmers to Rhodesia, and some to Nyasaland, British East Africa, German South-West Africa, the Congo State, and Portuguese East Africa, so there is reason to expect that Teff will, ere long, become a staple hay-crop throughout civilized Africa.

Composition.—Analyses of Teff-hay made by Herbert Ingle, F.I.C., late Chief Chemist of the Transvaal Department of

Agriculture, show (14) that Teff-hay has as well-balanced an albuminoid ration as oat-hay. The following comparison is made from the figures supplied in Mr. Ingle's Report :—

——	Teff-hay.		Oat-hay.	Boer Manna.		Lucerne hay.
	A.	B.		A.	B.	
Moisture	8·88	9·16	8·00	8·25	6·54	7·97
Ash	5·55	6·71	4·23	7·78	6·06	8·94
Protein	6·21	4·72	5·65	5·00	4·90	15·49
Soluble Carbohydrates ...	39·08	42·71	44·04	46·24	38·93	30·58
Ether Extract	1·21	1·07	3·87	1·88	1·07	2·36
Crude fibre	39·07	35·63	34·22	30·85	42·50	34·76
	100·00	100 00	100·00	100·00	100·00	100·00
Albuminoid ratio :						
Conventional	1:6·8	1:9·6	1:9·4	1.10·1	1:8·5	1:2·3
Suggested	1:12·8	1:16·8	1:14·5	1:15 8	1:16·8	1:4·4
The ash included :						
Silica	3·25	4·08	2·01	5·67	2·44	0·49
Potash	1·28	1·62	—	—	2·30	3·61
Lime	0·30	0·27	0·18	0·30	0·21	1·38
Phosphorus pentoxide ...	0·24	0·28	0·34	0·32	0 09	0·32
Ratio of lime to 100 of phosphorus pentoxide.	125	96	53	94	217	431

The grain of Teff (Red) has been analysed by Professor Sir A. H. Church (3), whose report is as follows :—

	In 100 parts.
Water	15·2
Albuminoids	8·2
Starch, &c.	68·1
Oil	2·8
Cellulose, &c.	2·8
Ash	2·9
	100·0

"The ratio between the albuminoids, or flesh formers, and the heat-givers, or force producers (calculated as starch) is here 1 : 9. This ratio is less satisfactory than that of the majority of millets, but is near that of *Panicum miliare*" (common or broom-corn millet).

Teff has raised scores of small Transvaal farmers from poverty to comparative comfort, and has been largely instrumental in putting the dairy industry of the Witwatersrand on its feet. The opinion has been expressed by our farmers that "if the Division of Botany of the Department of Agriculture had done nothing else, the introduction and establishment of Teff as a farm-crop would have more than paid South Africa the whole cost of the Division for the ten years of its existence."

The chief value of Teff as a hay crop lies in its palatability, high nutritive value, narrow albuminoid ratio (for a grass-hay), heavy yield, rapid growth, and drought-resistance. My experience with Teff in the Transvaal is that if sown in October (provided we have fairly good rains to establish the braird), we can obtain a cutting of

about a ton of hay per acre by the first week of the New Year ; at this time we often have 10 days to 2 weeks free from rain, which allows farmers to harvest the crop nicely. Our steady rains usually begin about the middle of January ; these induce the Teff to start fresh growth, which continues till the dry weather begins in March ; by this time another hay crop of 1 to 1½ tons per acre can be cut and cured. Light showers usually occur in March, enabling the Teff crop to make an aftermath which furnishes good pasturage until it is killed by frost.

References.

(1) Richard : Tentamen Florae Abyssinicae, vol. ii, p. 429 (1851) ; quoted in (3).

(2) Bruce : Travels to Discover the Source of the Nile, vol. vii, pp. 184–6 ; quoted in (3).

(3) Teff : in Kew Bulletin 1887, No. 1, pp. 2-6.

(4) Medley Wood, J. : Natal Botanic Gardens, Durban, Annual Report, 1887.

(5) Medley Wood, J. : Natal Botanic Gardens, Durban, Annual Report, 1888.

(6) Agri.-Hort. Society of India, Proccedings, 1888, p. lxxii.

(8) Tropical Fodder Grasses : in Kew Bulletin 1894, pp. 378–380.

(9) Burtt-Davy, J. : in Transvaal Department of Agriculture, Annual Reports 1903–04, p. 272 ; 1904–05, p. 248 ; 1905–06, p. 112 ; 1906–07, p. 175 ; in Transvaal Agricultural Journal, vol. iii, No. 11, April 1905, pp. 536–541.

(10) Sampson, H. C. : in Transvaal Agricultural Journal, vol. iii, No. 11, April 1905, p. 547.

(11) Wentworth-Sykes, J. : " Teff " : in Agricultural Journal of the Union of South Africa, vol. i, No. 3, pp. 443–446, April 1911.

(12) Medley-Wood, J. : in op. cit. No. 5, p. 718, June 1911.

(13) Wentworth-Sykes, J. : in op. cit. vol. ii, No. 2, p. 220, Aug. 1911.

(14) Ingle, H. : in Transvaal Dept. of Agriculture, Annual Report for 1906-07, p. 255.

(15) Medley-Wood, J. : Natal Botanic Gardens, Durban, Annual Report, 1889.

(16) Duthie, J. F., F.L.S. : Saharanpur Gardens, Report for the year 1888, pp. 11–12.

IV.—DECADES KEWENSES

Plantarum Novarum in Herbario Horti Regii Conservatarum.

DECADES LXX—LXXI.

691. **Thalictrum Purdomii**, *J. J. Clark* [Ranunculaceae - Anemoneae] ; species *T. minori*, L., valde affinis sed pedicellis subcapillaribus longioribus, floribus majoribus, sepalis acutis vel acuminatis.

Herba ramis sulcatis rubro-viridibus fistulosis glabris. *Folia* trivel bi- pinnata, ambitu ovata, ad 20 cm. longa, ad 15 cm. lata,

pinnis 3–5-jugis inferioribus ad 15 cm. longis, pinnulis circiter 3-jugis ; foliola ovata, trilobata, lobo intermedio plerumque acute vel subacute tridentato, basi rotundata, glabra, membranacea, subtus subglauca ; petioli breves, uti rhachis angulato-striati ; petioluli ultimi ordinis breves vel brevissimi, raro ad 3 mm. longi ; stipulae petioli basi adnatae, perlatae, simplices, parvae. *Flores* in paniculam inferne foliatam laxam dispositi, parvi, virescentes, penduli ; bracteae ad basin pedicelli subulatae, breves ; pedicelli subcapillares, valde inaequales, longiores ad 15 mm. longis. *Sepala* 4, ovato-lanceolata, 4·5 mm. longa, acuta vel acuminata, 3-nervia. *Stamina* circa 14 ; antherae lineares, apiculatae, 3 mm. longae ; filamenta filiformia ad 2 mm. longa. *Carpella* 5, sessilia, longitudinaliter 8-costata ; stigmata triangularia. *Achaenia* oblique oblonga, teretia, costis acutis lateralibus dorsali proximis quam ceteris minus altis, 3·5 mm. longa stigmate dempto.

N. China. *Purdom*, 169.

The plant described was grown by Messrs. Veitch & Sons at Langley nursery from seeds collected by Mr. W. Purdom in N. China.

692. **Onobrychis (Hymenobrychis) Sykesiae**, *N. D. Simpson* [Leguminosae-Hedysareae] ; affinis *O. vaginali*, C. A. Mey., sed petiolis longioribus, dentibus calycinis longioribus, vexillo breviore, alis parvis obtusis auricula obtusa parva, carina paulo longiore distincta.

Herba radice funiculari, caulescens, ultra 25 cm. alta, pilis longis tenuissimis patulis sericeis laxe vestita. *Folia* ad 10 cm. longa, 4–8-juga ; foliola late ovata, elliptica vel obovata, obtusa, minute mucronata, ad 18 mm. longa, 12 mm. lata, supra glabra, subtus pilis tenuissimis longis sericeis laxe villosa ; petiolus ad 5 cm. longus ; stipulae subherbaceae, late lanceolatae, acuminatae, basi connatae, intus glabrae, extus molliter sericeo-villosae. *Racemi* albido-sericei, multiflori ; flores primum dense congesti, deinde laxi ; bracteae lineares, acuminatae, 6 mm. longae ; pedicelli 1–3 mm. longi ; bracteolae filiformes, 1·5 mm. longae. *Calyx* campanulatus, 4 mm. longus, pilis longis sericeis vestitus, dentibus anguste linearibus, ad 9 mm. longis, infero carinam aequante. *Corollae* vexillum obovatum, bilobum, 1·4 cm. longum, 9 mm. latum, sicco ochroleucum, nervis distinctis atropurpureis longitudinaliter striatum, extus laxe villosulum ; alae glabrae, obtusae, 5 mm. longae, 2·6 mm. latae, margine superiore 1 mm. infra apicem unidentata, auricula obtusa brevi deorsum directa ; carina 1·3 cm. longa, 6 mm. lata, obtusa, auricula parva, ungue 4 mm. longo. *Ovarium* glabrum biovulatum ; stigma nudum, parvum.

Persia. Khorasan, *Sykes*, 110.

693. **Astragalus (Cercidothrix) Sykesiae**, *N. D. Simpson* [Leguminosae-Galegeae] ; potius ad *A. Holdichianum*, Ait. et Baker et *A. Cuscutae*, Bge., accedens, sed foliis 3–5-jugis, foliolis fere orbicularibus, pedunculis folia non excedentibus, vexillo margine integro breviore et carina angustiore, ovario subsessili 34-ovulato.

Herba perennis, rhizomate funiculari descendente parce ramoso, acaulis, caespitosa, pube cana adpressa medio fixa vestita. *Folia* basi congesta, imparipinnata, 3–7-juga, ad 10 cm. petiolis inclusis

longa; petioli ad 4 cm. longi, basibus persistentibus; foliola obovato-orbicularia, brevissime petiolulata, obtusissima vel minute mucronulata, majora ad 1·3 cm. longa et 1·1 cm. lata, utrinque pilis albis adpressis dense vestita; stipulae imbricatae, triangulares, acutae, ad 6–7 mm. longae, subtus pilis longis dense vestitae, supra glabrescentes. *Racemi* laxi, 4–5-flori, pedunculis 4–8 cm. longis; bracteae ascendentes, 3 mm. longae; bracteolae 2, calycem subtendentes. *Calyx* tubulosus, 1·2–1·5 cm. longus, viridis, nervis primariis purpurascentibus, pilis albis adpressis vestitus, dentibus lanceolatis acutis 3·5 mm. longis. *Corolla* calyce sesquilongior, sicco lutea, apice atropurpurea; vexillum late elliptico-oblongum, 2·4 cm. longum, 1·9 cm. latum, abrupte in unguem angustum 4–5 mm. longum contractum, margine integro, glabrum, alas paullo superans; alae liberae, 2·2 cm. longae, 6 mm. latae; lamina superne rotundato-obovata, inferne obtuse auriculata, ad 1 cm. longa; carina 1·9 cm. longa, apice obtusa, subemarginata. *Ovarium* subsessile, pilosum, 34-ovulatum; stigma nudum, minute capitatum.

Persia. Khorasan, *Sykes*, 112.

694. **Flemingia angusta**, *Craib* [Leguminosae-Phaseoleae]; ob foliola longiuscula, angusta, racemos petiolos subaequantes vel paulo superantes distincta.

Ramuli glabri vel subglabri, cortice pallide brunneo striato inconspicue pauci-lenticellato obtecti, ad 3 mm. diametro. *Folia* trifoliolata, petiolo communi alato dorso bisulcato 5·3–6·3 cm. longo parce pubescente suffulta; stipulae deciduae; foliola anguste lanceolata, apice attenuata, acuta, basi terminalia aequaliter cuneata, lateralia inaequaliter cuneata, ad 22·5 cm. longa et 3·2 cm. lata, chartacea, supra glabra, subtus pallidiora, glandulosa, nervis tantum parcissime adpresse pilosula, nervis lateralibus utrinque ad 11 supra cum costa conspicuis subtus prominentibus, nervis transversis subtus prominulis; petioluli inter se subaequales, circiter 4 mm. longi, validiusculi, plus minusve adpresse pubescentes. *Racemi* axillares, petiolos demum parum superantes, subsessiles; bracteae deciduae, lanceolatae, acutae, 5–6 mm. longae, distincte nervatae, ciliatae. *Calycis* tubus circiter 2 mm. longus, lobi superiores lateralesque lanceolati, acuti, ad 3 mm. longi et 1 mm. lati, lobus inferior lineari-lanceolatus, acutus, 4·5 mm. longus. *Vexilli* lamina 5·5 mm. diametro, basi auriculata, ungui 1·5 mm. longo; alae 3·5 mm. longae, 1·25 mm. latae, ungui 1·5 mm. longo; carina 5 mm. longa, ungui circiter 2 mm. longo. *Ovarium* 1·5 mm. altum, glabrum; stylus medio incrassatus, glaber. *Legumen* vix maturum, circiter 1 cm. longum.

Indo-China. Burma: Tharrawaddy, Kangyi Reserve, 21 m., *Lace*, 5858 (type); Pegu River, *McClelland*; Henzada, *Shaik Mokim*, 1345.

695. **Flemingia Lacei**, *Craib* [Leguminosae-Phaseoleae]; a *F. involucrata*, Benth., capitulis conspicue pedunculatis, floribus conspicuis, calycis brevioris lobis haud dense longe ciliatis facile distinguenda.

Fruticulus 30–60 cm. altus (ex *Lace*); caules primo albido-pubescentes parceque glandulosi, mox subscabridi, ad 5 mm. diametro. *Folia* trifoliolata, petiolo 1·6–3·7 cm. longo supra

conspicue canaliculato parce pubescente glandulosoque plus minusve glabrescente suffulta ; stipulae deciduae, oblongo-lanceolatae, acute acuminatae, fere 1·5 cm. longae et 5 mm. latae, utrinque pubescentes, ciliatae ; foliola foliorum superiorum plerumque late lanceolata, acutiuscula, inferiorum suborbicularia, apice rotundata, basi terminalia late cuneata, truncata, lateralia obliqua, latere altero cuneata, altero rotundata, 4·5–6 cm. longa, 2–5·4 cm. lata, firme chartacea, supra primo puberula, mox glabra, infra glandulosa, costa nervisque parce pubescentia, ciliata, nervis lateralibus utrinque 7–9 supra conspicuis subtus prominentibus ; petioluli 2–3 mm. longi, pubescentes ; stipellae vix 2 mm. longae. *Inflorescentia* e capitulis et axillaribus et terminalibus paucifloris ad 4 cm. diametro constituta ; pedunculus communis 1·4–1·8 cm. longus, albo-pubescens parceque glandulosus ; bracteae involucrantes circiter 6, ovatae, acute acuminatae, circiter 1 cm. longae et 5·5 mm. latae, dorso tenuiter pubescentes, ciliatae, intra inferne praecipue tenuiter albo-pubescentes ; pedicelli brevissimi. *Calycis* tubus 4 mm. longus, extra pilis longis albidis instructus, intra ut lobi adpresse albo-pubescens ; lobi 5, lanceolati vel late lanceolati, acuti, ad 1 cm. longi et 4 mm. lati, extra pilis albidis basi tuberculatis instructi, ciliati. *Vexilli* lamina 1·5 cm. longa et 1·9 cm. lata, basi auriculata, in unguem 7 mm. longum et 4 mm. latum contracta, extra parce brevius pubescens glandulosaque, intra glabra ; alae lamina ad 1·1 cm. longa et 6 mm. lata, ungui circiter 9 mm. longo ; carina circiter 9 mm. longa, ungui ad 1 cm. longo suffulta. *Ovarium* circiter 2 mm. altum, densius albo-pilosum ; stylus inferne filiformis, circiter 5 mm. e basi subito ad 1. mm. expansus, apice infra barbatus. *Legumen* 7 mm. longum, 3 mm. diametro, tenuiter pilosum, monospermum ; semina nigra, ambitu oblonga, 4 mm. longa, 2·25 mm. diametro.

Indo-China. Upper Burma : Maymyo Plateau, on stony hills, 1050 m., *Lace*, 5956.

696. **Dissochaete acmura**, *Stapf & M. L. Green* [Melastomaceae] ; affinis *D. annulatae*, Hook. f., et *D. Cummingii*, Naud., ab illa indumento subtiliore, bracteis staminibusque minoribus, ab hac floribus majoribus distincta.

Planta scandens ; rami teretes, juniores et folia (subtus) et inflorescentia pilis stellatis rufo-furfuraceo-tomentella. *Folia* ovata vel oblonga, superne longe attenuata, tunc caudato-acuminata, basi rotundata vel subcordata, 11–13 cm. longa, 4–5 cm. lata, membranacea, supra glabra, 5-plinervia vel fere 5-nervia, nervis supra insculptis ; petiolus ad 1 cm. longus. *Inflorescentiae* axillares terminalesque in thyrsum laxum foliatum collectae, inferiores paniculatae, tandem ad 8 cm. longae, superiores ad cymas trifloras vel bifloras reductae ; pedicelli 5–7 mm. longi ; bracteae citissime caducae, summae tantum visae lineares, 3 mm. longae. *Calyx* 0·9–1 cm. longus, subtruncatus, ferrugineo - tomentosus, tubo oblongo-campanulato. *Petala* obovata, ad 2 cm. longa, 1·25 cm. lata. *Stamina* 8 ; filamenta 1–1·1 cm. longa ; antherae 4 majores, curvatae, 1–1·2 cm. longae, connectivo basi producto ad 5 mm. longo, appendicibus anticis 1–2 mm. longis, posticis 0·5 mm. longis ; antherae 4 minores ad 1·2 cm. longae, connectivo non producto,

appendicibus anticis 3–4 mm. longis, posticis 0·5 mm. longis. *Stylus* 1 cm. longus. *Fructus* submaturi ad 1·2 cm. longi, ad 6 mm. lati.

PHILIPPINE ISLANDS. Luzon: Jayabas Province, *Cumming*, 815, 2840; Albany Province, *Cumming*, 2838.

697. **Agapetes Lacei**, *Craib* [Vacciniaceae - Thibaudieae]; ab *A. obovata*, Hook. f., corolla quadruplo longiore, ab *A. mitrarioide*, Hook. f. et *A. buxifolia*, Nutt., foliis minoribus nervis supra obscuris, corollae lobis majoribus recedit.

Ramuli setis ascendentibus instructi. *Folia* plus minusve elliptica, apice acuta vel obtusa, basi cuneata vel rotundata, 0·7–1·5 cm. longa, 6–8 mm. lata, coriacea, glabra, margine superne serrulata, nervis lateralibus utrinque circiter 5 subtus plerumque conspicuis supra omnino obscuris, petiolo circiter 1 mm. longo supra minute puberulo suffulta. *Flores* solitarii; pedicelli 1·5–1·8 cm. longi, puberuli praetereaque pilis albis divergentibus glandulosis hic illic instructi. *Receptaculum* 4 mm. longum, 3·5 mm. diametro, puberulum. *Calyx* 4 mm. longus; lobi deltoidei, acuti, 2·75 mm. longi, 2·5 mm. lati, conspicue nervati. *Corollae* tubus 2 cm. longitudine paullulo excedens, lobi deltoidei, acutiusculi, 8 mm. longi, 5·5 mm. lati. *Filamenta* circiter 1·5 cm. longa; antherae conniventes, 1·6 cm. longae, basi apiculatae, dorso haud calcaratae.

INDO-CHINA. Burma: Bhamo; Lapyeka to Sinlum Kaba, 1500 m., *Lace*, 5771.

698. **Agapetes oblonga**, *Craib* [Vacciniaceae - Thibaudieae]; ob ramulos longe setosos receptaculaque longe dense hirsuta distincta.

Ramuli setis divergentibus circiter 4 mm. longis densius instructi, cortice pallido. *Folia* oblonga vel oblongo-lanceolata, apice acuta, basi truncata, 3·5–6 cm. longa, 1–1·9 cm. lata, chartaceo-coriacea, glabra, margine apice tantum serrulata vel interdum inferne obsolete serrulata, nervis lateralibus utrinque circiter 9 cum nervis transversis pagina utraque conspicuis, petiolo valido 1–1·5 mm. longo suffulta. *Corymbi* 2–3-flori, sessiles vel subsessiles; pedicelli ad 1·2 cm. longi, apice articulati, plerumque superne puberuli sed etiam interdum setis parce instructi. *Receptaculum* 2·5 mm. altum, ad 2·5 mm. diametro, longe dense hirsutum. *Calyx* 3·5 mm. altus; lobi vix 2 mm. longi, 1·75 mm. lati. *Corollae* tubus 1·9 cm. longus, lobi deltoidei, obtusiusculi, 1·5 mm. longi, vix 2·5 mm. lati. *Filamenta* 1·2 cm. longa; antherae 8 mm. longae, dorso breviter bicalcaratae.

INDO-CHINA. Burma: Bhamo; Lapyeka to Sinlum Kaba, 1500 m., *Lace* 5772.

699. **Dionysia Lamingtonii**, *Stapf* [Primulaceae]; affinis *D. Michauxii*, Boiss., affinis, sed calyce minus alte fisso, corollae tubo os versus paulum dilatato caeterum angustissime cylindraceo, staminibus alte insertis distincta.

Herba compacte pulvinaris, ramis vetustis diu foliis emarcidis vestitis, junioribus apice rosulam viridem 2·5–3 mm. diametro gerentibus. *Folia* plana, spathulato-oblonga, acutiuscula vel subobtusa, integra, 2·5–3 mm. longa, vix ad 1 mm. lata, inferne hyalino-membranacea, parte dilatata herbacea albo-pilosa flabellatim

nervosa. *Flores* solitarii. *Calyx* ultra medium 5-partitus, 3 mm. longus, parce pilosulus, segmentis oblongis obtusis. *Corolla* aurea, tubo filiformiter-cylindraceo inferne parcissime glanduloso caeterum glabro 1·2 cm. longo os versus paulo ampliatus ; lobi obovati, retusi, 3 mm. longi. *Antherae* summo tubo insertae. *Stylus* cum stigmate 7 mm. longus.

South-west Persia. Bahtian (?), 1200–1800 m., *Lord Lamington.*

700. **Wightia Aplinii**, *Craib* [Scrophulariaceae - Cheloneae] ; a *W. gigantea*, Wall., foliis supra molliter breviter stellato-pubescentibus, thyrsis brevioribus, floribus congestis, staminibus longe exsertis distinguenda.

Ramuli primo breviter albido-stellato-tomentelli, mox glabri, cortice fusco-brunneo parce lenticellato obtecti. *Folia* ovato-elliptica, apice acuminata, obtusa, basi truncata vel subcordata, 7·5–15 cm. longa, 5·4–9 cm. lata, coriacea, supra ob pilos albidos stellatos paucos mollia, subtus densius albido-tomentella, nervis lateralibus utrinque 4–5 pagina superiore leviter immersis inferiore prominentibus, nervis transversis supra obscuris vel subobscuris subtus prominulis, petiolo valido ad 2 cm. longo albido-stellato-tomentello suffulta. *Thyrsi* axillares, ad 7 cm. longi, 3–4 cm. diametro, pedunculo communi ad 3 cm. longo suffulti. *Calycis* tubus 5 mm. longus, apice 8 mm. diametro, lobi apice rotundati, 3 mm. longi, 3·5 mm. lati. *Corollae* tubus 1·45 cm. longus, basi 4 mm., apice 1·1 cm. diametro, lobus anticus oblongus, obtusus, 7 mm. longus, 5 mm. latus, lobi laterales apice rotundati, 5 mm. longi, 8 mm. lati, duo postici in unum bifidum connatum, 8 mm. longi ; corolla extra stellato-tomentella, intra staminum insertionem circa pilosa. *Filamenta* longiora 3·7 cm. longa, breviora 3·2 cm. longa. *Ovarium* 3 mm. altum, 3 mm. diametro, glabrum ; stylus 3·8 cm. longus.—*W. gigantea*, Coll. et Hemsl. in Journ. Linn. Soc., vol. xxviii. p. 99, *vix* Wallich.

Indo-China. Upper Burma : Shan States ; hill east of Tapet, 1200 m., *Aplin.*

701. **Loranthus Robertsonii**, *Gamble* [Loranthaceae-Lorantheae]; species *L. ferrugineo*, Roxb., affinis, foliis majoribus coriaceis ovatis cordatis glabris irregulariter nervosis et inflorescentia lanugine aurea molli densissime obtecta differt.

Frutex parasiticus, ad 1 m. altus, ramulis fulvis teretibus parce tomentosis strictis. *Folia* coriacea, subopposita, ovata, apice obtusa, basi paullo cordata, glabra, 10–13 cm. longa, 6–8 cm. lata, costa crassa, nervis utrinque circa 6 irregularibus cito ramosis et in medio laminis anastomosantibus, nervulis transversis paucis irregularibus ; petiolus crassus, 5 mm. longus. *Flores* in cymis paucifloris axillaribus fasciculatis lanugine fulvo-aurea molli densissime obtectis ; cymae 1–2 cm. longae, 4–5-florae ; pedunculus gracilis, vix 1 cm. longus ; pedicelli 4 mm. longi ; bractea parva, obtusa, inconspicua. *Calycis* tubus 3 mm. longus, cupularis, limbo brevi inconspicuo. *Corollae* tubus in alabastro clavatus, 1·5–1·6 cm. longus, florens uno latere fere ad basim fissus, infra lobos constrictus ; lobi 4 patentes, acuti, 6–8 mm. longi, intus glabri. *Stamina* 4, linearia, 2 mm. longa ut etiam filamenta. *Ovarium* ovoideum, stylo gracili geniculato, stigmate parvo capitato. *Fructus* non visus.

INDO-CHINA. Upper Burma: near Mawkmai; in dry scrub jungle, parasitic on trees, 750 m., *W. A. Robertson*, 219, Jan. 22, 1911.

702. **Elytranthe papillosa**, *Gamble* [Loranthaceae-Lorantheae]; species distincta *E. retusae*, G. Don, affinis, foliis minoribus oblanceolatis, racemis bifloris et calycis tubo et corollae lobis extus prominenter papillosis differt.

Frutex parasiticus, ramulis teretibus scabris siccitate pallide brunneis. *Folia* coriacea, opposita, oblanceolata, apice rotundata, basi cuneata, siccitate utrinque opaca, olivacea, 3–4 cm. longa, circa 1·5 cm. lata, costa gracili inconspicua, nervis utrinque 1–2, pare infimo e basi ad apicem producto, supero paullo altius orto breviore vel nullo, omnibus perobliquis, reticulatione obscura; petiolus nullus vel vix 3 mm. longus. *Flores* flavo-aurantiaci, in racemis 1–2-floris axillaribus pedunculatis; pedunculus circa 1 mm. longus, ut etiam pedicelli; bractea parva, ovata, acuta; bracteolae minutae, labium bilobum formantes. *Calycis* tubus ovoideus, 2 mm. longus, prominenter papillosus, limbo subnullo. *Corollae* tubus glaber, in alabastro cylindricus, supra 6-angulatus, florens infundibuliformis, 7–8 mm. longus; lobi 6, extus prominenter papillosi, spatulati, recurvi, 5–6 mm. longi. *Stamina* 6, antheris oblongis 1·5 mm. longis, filamentis gracilibus 5 mm. longis. *Ovarium* ovoideum, stylo gracili, stigmate capitato. *Fructus* non visus.

MALAY PENINSULA. Singapore: Kranji, *Ridley*, 2045, Feb. 1891.

703. **Elytranthe Barnesii**, *Gamble* [Loranthaceae-Lorantheae]; *E. globosae*, G. Don, affinis, foliis oblongo-lanceolatis, ramulis praecipue ad nodos crassis, racemis brevioribus magis fasciculatis differt.

Frutex parasiticus, glaber, ramulis praecipue ad nodos crassis, cortice aspero. *Folia* coriacea, opposita, lanceolata vel oblongo-lanceolata, apice obtuse acuminata, basi rotundata et saepe inaequalia, marginibus recurvis, 6–12 cm. longa, 2·5–4·5 cm. lata, supra lucida, infra opaca, siccitate olivacea, costa supra et infra prominente, nervis utrinque 7–9 fere angulo recto e costa ortis prope marginem curvatis, reticulatione obscura; petiolus crassus, 5–7 mm. longus. *Flores* in racemis 4–5-floris glabris circiter 12–15 mm. longis plerisque simul ad nodos incrassatos fasciculatis ex axillis foliorum ortis vel subterminalibus; pedicelli graciles, 1·5–2 mm. longi; bractea et bracteolae ovato-acutae, fere liberae. *Calycis* tubus ovoideus, sulcatus, limbo 1 mm. longo truncato. *Corolla* in alabastro clavata, angulata, 8 mm. longa; lobi 6, lineares, acuti, e medio reflexi. *Stamina* 6; antherae oblongae, 1·25 mm. longae; filamenta 3·5 mm. longa. *Ovarium* ovoideum, stylo gracili paullo angulato, stigmate obtuso vel emarginato. *Fructus* ignotus.

MALAY PENINSULA. Pahang: Kluang Terbang, *W. D. Barnes*, 10,905.

704. **Elytranthe Robinsonii**, *Gamble* [Loranthaceae-Lorantheae]; species distincta, *E. Lowii*, Gamble (*Loranthus Lowii*, King), affinis, racemis corollaque minoribus et pedicellis glabris differt.

lobi 5, triangulares, 1 mm. longi. *Discus* pentagonus, complanatus. *Stamina* 5, filamentis brevibus, antherarum thecis globosis. *Stigma* centrale, 5-lobatum. *Drupa* (immatura) ovato-oblonga, 5–6 mm. longa, endocarpio intus sulcato.—*H. granulata*, Hook. f. & Th. ? Coll. et Hems. in Journ. Linn. Soc. xxviii. 121.

INDO-CHINA. Upper Burma: At Moungtaya, 1500 m., *Sir H. Collett*, 772. On an "ingyin" (*Pentacme suavis*, A. DC. ?) tree at Mönghai, Kengtawng, *W. A. Robertson*, 326, April 1901.

710. **Henslowia shanensis**, *Gamble* [Santalaceae-Osyrideae]; species gracilis *H. buxifoliae*, Blume, affinis, foliis majoribus, floribus fasciculatis differt.

Frutex parasiticus, ramulis gracilibus teretibus ultimis angulatis cortice rufescente vix lenticellato. *Folia* coriacea, alterna, obovata, apice rotundata, basi cuneata, 3–5 cm. longa, 1–2 cm. lata, utrinque glabra, siccitate fere nigra, costis basi ortis 3, intermedia paulo superius nervos 2 emittente et cum iis fere ad apicem producta venis e costa centrali paucis brevibus curvatis; petiolus 0·5 mm. longus, in laminam gradatim expansus. *Flores* ♂ in fasciculos axillares vel e ramulis infra folia ortos basi perulis minimis suffultos dispositi, fasciculo utroque flores 2–7 gerente; pedicellus 1–2 mm. longus, bracteis 2–3 basin versus et bracteolis 3 sub perianthii tubo instructus. *Perianthii* tubus in ♂ obconicus, 1 mm. longus, glaber; lobi 5–6, triangulares, vix 0·5 mm. longi. *Discus* conspicuus, 5–6-lobatus. *Stamina* 5–6, filamentis brevibus, antherarum thecis globosis. *Stigma* centrale, complanatum, 5-lobatum. *Fructus* ignotus.

INDO-CHINA. Upper Burma: at Mönghai, Kengtawng, 450 m., *W. A. Robertson*, 295, March 1911.

V.—MISCELLANEOUS NOTES.

DR. C. A. BARBER.—We are informed that Dr. Barber, whose appointment as Government Botanist, Madras, was announced in *K.B.*, 1898, p. 277, has been appointed Government Sugar-Cane Expert at the Agricultural College, Coimbatore, S. India.

MR. JAMES GILBERT WATSON, formerly a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, an Assistant Superintendent of Government Plantations in the Federated Malay States.

MR. G. E. WILLIAMS, an employee in the Royal Botanic Gardens, Kew, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, to the post of a Working Forester in the East Africa Protectorate.

Additions and alterations to Gardens, 1912.—Additions to the collections of plants cultivated at the Royal Botanic Gardens, Kew, have been made during the year by exchanges with other gardens, private as well as public, and by purchase from nurserymen and others. Contributions of plants and seeds received from Botanic Gardens and other Institutions include the following :—

Agri-Horticultural Society of India. Wardian case of Hibiscus and Cannas.

Antigua. Plants of *Melocactus communis.*

Arnold Arboretum. American and Chinese trees and shrubs.

British Guiana. Palm and other seeds.

Calcutta. Two Wardian cases of Bamboos ; tubers of *Amorphophallus ;* collection of Himalayan seeds.

Dominica. Wardian case of Begonias ; succulent plants.

Dunedin. Wardian case of plants ; collections of native seeds.

Kumaon. Orchids.

Mauritius. Palm seeds.

Missouri. Agaves ; and seeds.

Ootacamund. Orchids.

St. Vincent. Bulbs of *Hippeastrum equestre.*

Southern Nigeria. Wardian case of plants ; seeds of *Raphia vinifera.*

Sydney. Collection of seeds.

Transvaal. Plants of *Musa ventricosa,* Euphorbias, etc.

Trinidad. Orchids.

U.S. Department of Agriculture. Various plants.

U.S. National Museum. Collection of Californian seeds.

Zanzibar. Two Wardian cases of plants ; collection of *Sansevieria* spp.

Exchanges were made with the Botanic Gardens of Edinburgh, Glasnevin, Cambridge and Oxford, and with most of the European gardens upon whom Kew is largely dependent for seeds of those annual herbaceous plants which fail to produce seeds at Kew.

Other donations to the Gardens include the following :—

Mr. H. Darton, Hertford. Collection of British mosses.

Mr. M. T. Dawe, Mozambique. Bulbs and seeds.

Capt. A. A. Dorrien Smith, D.S.O., Berkhamsted. Seedlings of Australian plants.

Dr. Drake Brockman, Berbera. Seeds of *Cordeauxia edulis* ("Yeheb").

Messrs. H. J. Elwes and W. R. Price. Plants and seeds collected in Formosa.

Messrs. Drège and Pillans, and Drs. Marloth and Schönland. South African Euphorbias.

Mr. J. Gossweiler, Angola. Collections of seeds.

Lady Grey. Cuttings of a collection of Cape Heaths.

Mr. A. W. Hill. West Indian Orchids.

Mr. G. N. Humphreys. Mexican seeds.

Mr. G. Hartmann, Niederhöchstadt, Mr. C. H. Lankester, Costa Rica, Mr. C. Roebelin, Bangkok, and Mr. F. S. Sillitoe, Khartoum. Orchids.

Prof. Pearson, Cape Town. Numerous succulent plants, bulbs and seeds.

Dr. G. V. Perez, Teneriffe. Seeds of Canary Island plants.
Dr. R. S. Rogers, Adelaide. Australian ground Orchids.
Dr. P. Roth, Bernberg. Ceropegias.
Hon. N. C. Rothschild. Large plant of the rare *Echinocactus arizonicus.*
Messrs. Sander and Sons, St. Albans and Bruges. Orchids, etc.
Mr. Philippe L. de Vilmorin, Paris. Herbaceous plants.

A number of interesting plants exhibited at the Royal International Horticultural Exhibition were purchased.

Among the plants and seeds of interest distributed from Kew during the year were the following:—Agave seeds (in variety), Chinese plants of recent introduction, *Cordeauxia edulis*, "Yeheb" (seeds), *Musa ventricosa* (seeds), *Rhamnus Purshiana*, and *Zizania aquatica.*

Wardian cases of plants were sent to Northern Nigeria and Trinidad. Surplus trees, shrubs and herbaceous plants were presented to public institutions, and surplus Nymphaea tubers to public gardens. Collections of plants were sent to Antigua Botanic Station; Arnold Arboretum; Berlin Botanic Garden; Brussels Botanic Garden; The Residency, Berbera; Canadian Department of Agriculture; Liverpool Botanic Garden; National Fruit and Cider Institute; Osborne, I.W.; Oxford University Parks; Richmond Park; University College, Reading; University College School and U.S.A. Department of Agriculture, etc.

There was a large demand for seeds ripened at Kew and offered for distribution in *Bulletin*, Appendix 1, 1912.

Certain alterations and improvements have been carried out in the Botanic Gardens proper during the past year, among which the following are the more important:—

The reglazing of the central portion of the Temperate House has been completed, and the roof of the South Octagon reconstructed. A new house for Cattleyas, Cymbidiums, Sobralias, etc., has been erected on the south side of the T Range. The Rock Garden, which was made in 1882, having become somewhat overgrown and out of date, it was decided two years ago to reconstruct parts of it and remove several large trees the shade from which is unfavourable to alpine plants. The stone used is weathered mountain limestone from the Cheddar district. It is intended to complete the work in the autumn.

The following specially noteworthy plants flowered during the year:—

Agave, 6 species, including the fine specimen of A. atrovirens.
Akania Hillii.
Amherstia nobilis and Bakiaea insignis flowered freely in No. 1.
Amomum hemisphericum.
Anemopaegma grandiflorum.
Callicarpa purpurea, fruited well.
Catasetum, 20 species.
Coelogyne, 28 species.
Columnea gloriosa.

Coryanthes macrantha.
Cycadeae, 15 species.
Dahlia imperialis.
Eulophiella Elizabethae.
Pachira insignis.
Pinguicula gypsicola.
Pycnostachys Dawei.
Rosa gigantea.
Typhonodorum Lindleyanum, a young plant two years old from seed ripened at Kew, bore four fine flowers.
Solandra Hartwegii.

Pergola for Vines.—The need for a better means of exhibiting the collection of Vines (Vitis and allied genera) at Kew has long been felt. Ever since the reorganisation of the Arboretum by Sir Joseph Hooker about 40 years ago they have been grown on a curving line of iron posts near the North Gallery, where they have had to be treated as bushes rather than climbers; being pruned back every winter and the shoots being shortened once or twice during the summer. A pergola of the same type as the Rose Pergola has now been provided for them. It consists of two rows of iron uprights connected by flattish arching rods and linked together lengthwise by chains. The pergola is about 500 feet long, 11 feet wide, 10 feet high, and about 12 feet between each pair of uprights. It runs parallel with the Acacia Avenue, between it and the Refreshment Pavilion.

Riverside Avenue.—The northern end of the belt of trees and shrubs between this Avenue and the Ha-Ha near the Thames, whose object is to hide from view the ugly workshops and warehouses on the Brentford side of the river, has for some time been in an unsatisfactory state. In the belt were 30 to 40 middle-sized elms whose hungry roots effectually barred the growth of any but the coarsest shrubs beneath them. The undergrowth had in late years, in fact, become merely a thicket of ill-grown shrubs which served well enough as a screen in summer, but revealed its unsatisfactory and uninteresting character only too clearly in winter. A commencement has been made this winter to provide a belt of a different character. The elms, which had nearly all originated as suckers from a few older ones, have been cleared away and nearly one-half the belt has been replanted with an almost purely evergreen vegetation composed of Holm oak, pines, cherry laurels, bay laurel, and others of smaller growth. They have been brought here from various parts of the garden, the larger ones being 20 to 25 feet high.

Incidentally the Riverside Avenue itself will be much improved. Owing to the widely spreading, hungry roots of the elms and to the drip and shade from their branches, together with the increasing crowds that visit Kew, it has been impossible to keep the turf of the avenue in good order in recent years. The removal of the elms will relieve the grass from much competition at the root and the widening of the avenue will help to distribute the traffic over it more thinly and to let in more light and air.

This avenue, which now reaches from the Brentford Gate to the Isleworth Ferry Gate, once extended apparently to the mound in the S.W. corner of the Queen's Cottage Grounds where, in the 18th century, stood one of the temples or summer-houses erected by Queen Caroline. Owing probably to its nearness to the Thames it has for over one hundred years been a popular promenade. Evans, writing in 1825, in lament of the departure of Royalty from Kew ("Richmond and its Vicinity") says: "A respectable friend of Brentford informed me that when their Majesties resided at Kew the terrace near the river was frequented, especially on Sunday evenings, with a concourse of nobility and gentry. Stars and ribbons and garters glistened on the eye in uninterrupted succession. No music exhilarated the company, but the translucent stream of old Father Thames glided by with an equable and enviable placidity. All that gay and bustling scene, like a meteor shooting across the heavens, has vanished."

Sion Vista.—In his report for 1882, Sir Joseph Hooker observed that during the year the Sion Vista, previously occupied by a broad walk of rough gravel, which being unrolled was never walked upon, had been covered with soil and sown with grass seed. Since then, owing to most of the gravel being left in the walk, the grass has never grown satisfactorily, and as soon as a few hot dry days of summer weather came, the site of the old walk was always clearly defined by the grass turning brown. The consequence was that, in dry summers especially, the aspect of this fine vista was spoilt. The only remedy was to remove the gravel and provide the grass with a depth of soil similar to that at the sides. This work has been in progress as opportunity offered for the last seven or eight years. Much of the old walk was found to have been filled to a depth of 18 inches with a coarse shingle and sand. This was put through a screen, the sand being returned and soil being substituted for the shingle. The work was completed in December.

Rose Dell.—It has been found necessary to renew the soil in parts of the Rose Dell near the Pagoda made sixteen years ago, which had become overrun with the roots of adjoining trees. The occasion has been taken to add a selection of the best and most distinct of the new rambler roses to the collection planted here.

Additions to Arboretum.—As has been the case now for some years past, the most noteworthy additions to the hardy ligneous collections during 1912 have been of Chinese origin. These have been presented by the Arnold Arboretum, Mr. J. C. Williams of Caerhays, Messrs. Veitch, Mr. Maurice L. de Vilmorin and the Hon. Vicary Gibbs. Most of the plants are still under number, and to those of Mr. Wilson's collecting are now being added the results of the journeys of Messrs. Purdom and Forrest. Mr. Forrest is still in, or on the borders of, China. A very charming dwarf rhododendron of his introduction, *R. fastigiatum*, Franchet, flowered during the year; a species resembling *R. intricatum* in leaf and in colour of flower but very distinct in the long exserted stamens. It is interesting to note that both at Kew and with Mr. J. C. Williams it flowered when only a few inches high and within 17 months of sowing the seed—a remarkably short

period compared with that taken by most seedling rhododendrons. From Canon Ellacombe have been received several plants of great interest, especially old-fashioned roses of which he has so fine a collection. The Earl of Ducie sent seeds of *Fagus obliqua* which germinated well, and various plants have been received from Miss Ellen Willmott, Sir John Ross of Bladensburg, and Lady Hanbury, La Mortola.

Besides Messrs. Veitch among nurserymen, the establishment is indebted for valued contributions to Mr. Notcutt of Woodbridge, Messrs. Cheal, and Messrs. Slocock of Woking.

The following plants flowered for the first time in the Arboretum department :—

Berberis candidula	China.
„ Stapfiana (also fruited) ...	„
„ verruculosa („ „) ...	„
Corylus lacera („ „) ...	Himalaya,
„ mandschurica („ „) ...	Manchuria.
Deutzia longifolia	China.
Dipteronia sinensis	„
Fagus antarctica var. uliginosa	S. America.
„ obliqua	„
Hamamelis vernalis	N. E. America.
Magnolia salicifolia	Japan.
Pinus Armandii (also bore cones) ...	China.
Rhododendron Davidii	„
„ fastigiata	„
Ribes laurifolium	„
Rosa sertata	„
Rubus biflorus var. quinqueflorus ...	„
„ Giraldianus (also fruited)... ...	„
Salix Bockii	„
Sinofranchetia sinensis	„
Spiraea (Sorbaria) arborea	„
Stachyurus chinensis	„

Among plants of interest which have flowered once or twice before, Aesculus californica, Elliottia racemosa and Styrax Wilsonii were particularly good during the past year.

Waterfowl.—The past year has been a very successful one as far as the collection of waterfowl is concerned. The number of birds reared in the gardens was as follows :—Carolina ducks 34, Sheldrake 6, Cinnamon Teal 5, Common Teal 2, as well as a large number of Tufted duck, Moorhens and a few Dabchicks. Four Magellanic geese were reared, but only a small number of the other species of geese kept in the gardens owing to the destruction of eggs by carrion crows. These birds also killed the cygnet belonging to the black-necked swans when it was about ten days old.

Of other birds one stork was reared and four peafowl. The attempt of the Demoiselle cranes to hatch out a bird from the solitary egg laid proved abortive.

The only birds which produced a family and failed to rear their offspring were the Bahama ducks, which did not make a nest until too late in the year.

Three hybrids apparently between a Maned gander and a hybrid yellow-bill duck have been reared and are growing into handsome birds.

The following birds have been received in exchange for surplus Carolinas and other birds reared at Kew :—

A pair of Chestnut-breasted Teal, 1 Brazilian Teal, 1 Grey Teal and a pair of Blue-winged Teal from the Zoological Society of London. A Japanese or Baikal Teal and a Ruddy Sheldrake from H.M. Office of Works. One pair Cinnamon Teal, 1 pair Chiloe Widgeon, 1 pair Chile Pintail, 1 pair Chilian Teal, 1 Rosy-bill Duck and 3 Japanese Teal from various sources.

Through the kindness of Dr. Peringuey, Director of the South African Museum, Cape Town, an attempt was made to introduce the Black-footed Penguins from the Cape. A pair of these interesting birds reached Kew and settled down happily on the pond, but in the course of their wanderings one night they got outside the gardens. One of them was recaptured in the Ha Ha ditch, but the other, which had discovered the river, was hunted down by men from Brentford in boats and killed. The solitary bird again escaped when replaced in an enclosure on the pond and was at large for some days on the river above Richmond. According to a well-known daily paper the penguin was "a Japanese fishing Cormorant" which, "as it seldom rose from the water and disappeared for long intervals, many people mistook it for an otter." On its capture by the river police, the penguin was handed over to the charge of the Zoological Society.

Official Visits.—During the past year the vote for travelling expenses has been utilised as follows :—

The Director.—For the purpose of studying at the Herbarium of the Museum d'Histoire Naturelle, Paris.

The Assistant Director.—For travelling in Trinidad and Dominica.

The Curator.—In visiting horticultural establishments near Manchester.

The Assistant Curator.—To visit gardens in the Riviera, Italy, Istria and Dalmatia.

Mr. Irving.—To study the high Alpine vegetation of Switzerland.

The Keeper of the Herbarium.—For the purpose of continuing the study of the distribution of *Spartina* in Southampton Water and the Isle of Wight.

Mr. Skan.—In a visit to Paris for the purpose of studying at the Herbarium of the Museum d'Histoire Naturelle.

The Keeper of the Museums.—To visit Liverpool in connection with the importation of Tropical products.

Mr. Holland, Assistant in Museums.—For the purpose of attending the annual meeting of the Museums Association held at Dublin.

Mr. Dallimore, Assistant in Museums.—For the purpose of attending the meeting of the Royal Scottish Arboricultural Society, and in visits to Leicester in connection with the Willow industry.

Museums.—During the past year many interesting contributions have been made to the Museums, the more important having been recorded from time to time in the *Bulletin*.

A considerable number of fully labelled duplicate specimens have been distributed to various Institutions, including the following :—Cynfarthfa Castle Museum and Art Gallery, Merthyr Tydfil ; Public Library and Technical Schools, Worksop ; Borough Polytechnic Institute, London ; Museum, Florence ; University, Aberdeen ; Municipal Technical Institute, Belfast ; School for the Blind, St. Leonards, &c.

For the Bath and West and Southern Counties Show held at Cardiff, an exhibit was prepared for the Forestry Section, consisting mainly of duplicate material.

Though much has been accomplished in the period in generally improving the permanent collections, this section of the work has been somewhat hampered by the steadily increasing number of products received for determination, together with applications for general information on the properties, uses, and literature bearing upon various vegetable products.

In Museum No. IV., additional case accommodation has been provided in one of the upper rooms, and it is to be hoped that the remaining room will likewise be furnished during the present year. A third of the cases have been re-polished in Museum No. I., and much has been done in generally improving and re-labelling the contents of the cases on the top floor of this Museum.

Presentations to Museums.—The following miscellaneous specimens have been received in addition to those previously recorded in the Bulletin :—

Mr. Farquhar.—Section of wood of *Farquharia elliptica* from Southern Nigeria.

Mr. Charles Coltman Rogers, Stanage Park, Brampton Brian.—Cones of *Abies pectinata* and of *Abies numidica*.

Mr. A. Bruce Jackson.—Cones of *Abies magnifica*.

Mr. W. R. Price.—Chips of camphor wood (*Cinnamomum Camphora*) from Kagoshima, Japan.

The Right Honourable the Earl of Moray, Darnaway Castle, Forres.—Photographs of scenery in Darnaway Forest.

Messrs. Suarez Hermanos & Co., Ltd., Fenchurch Street, London, E.C.—Samples of Bolivian Rubber.

His Grace the Duke of Northumberland, Syon House, Brentford.—Section of trunk of Black Walnut (*Juglans nigra*) and Cones of *Taxodium distichum*.

Mr. C. K. Bancroft, Kuala Lumpur, Federated Malay States.—Sections of wood of Para Rubber tree (*Hevea brasiliensis*) to illustrate the production of burrs or nodules.

Mr. John Christie, Mark Lane, London, E.C.—Photo micrographs of stem and fibre of *Hedychium coronarium*. (See *K. B.*, No. 9, 1912.)

Mr. J. S. Gamble, Highfield, Liss, Hants.—Specimens of *Loranthus pentandrus* on a species of Citrus, also stems of *Indigofera pulchella* with galls. From the Shan States.

Mr. G. D. Patterson, Kew.—Fossil specimen of *Lepidostrobus*.

Dr. A. Galt, The Royal Scottish Museum, Edinburgh.—Examples of root-swellings on Alder (*Alnus glutinosa*).

The Right Honourable Lord Wimborne, Canford Manor, Dorset.—Section of trunk of *Cedrus atlantica*, also a plank of Black Poplar (*Populus nigra*).

Mr. Sydney Moore, Harden, Bingley.—Specimen of Bark Cloth made from a species of *Ficus*, Uganda.

Director of Agriculture, Southern Nigeria.—Spadices and Fruits of the Oil Palm (*Elaeis guineensis*).

Director, Botanic Gardens, Sydney, New South Wales.—Specimen of Western Whitewood (*Atalaya hemiglauca*).

Director of Agriculture, Mozambique.—Photograph and specimen of wood of *Khaya nyasica*.

Research in Jodrell Laboratory in 1912 :—

Avebury, Lord.—Notes on Pollen. (Journ. Roy. Microscop. Soc., 1912, pp. 473–512, tt. 7 and 8.)

Clark, J. J., Miss.—Abnormal Flowers of *Amelanchier spicata*. (Ann. Bot., vol. xxvi., pp. 948–949, with twelve figs. in text.)

Davie, R. C.—The Structure and Affinities of *Peranema* and *Diacalpe*. (Ann. Bot., vol. xxvi., pp. 245–268, tt. 28 and 29.)

Massee, G.—Additions to the wild Fauna and Flora of the Royal Botanic Gardens, Kew.—xiii. [*Chaetomium*, etc.]. (Kew Bull., 1912, pp. 161–166, with one plate.)

Massee, G.—A Disease of Sweet Peas, Asters and other Plants (*Thielavia basicola*, Zopf.). (Kew Bull., 1912, pp. 44–52, with one plate.)

Massee, G.—"White-heads" or "Take-all" of Wheat and Oats (*Ophiobolus graminis*, Sacc.). (Kew Bull., 1912, pp. 435–439, with five figs. in text.)

[Massee, G.]—Tomato-Leaf Rust. (Journ. Board Agric., vol xviii., pp. 920–921, with one plate.)

[Massee, G.]—Diseases of Raspberry and Loganberry. (Journ. Board Agric., vol. xix., pp. 124–126, with one plate.)

Massee, G.—The Presence of Tubers on Potato Haulms. (Journ. Board Agric., vol. xix., pp. 560–563, with one plate.)

Rothert, W.—Ueber Chromoplasten in vegetativen Organen. (Extr. du Bull. de l'Acad. des Sciences de Cracovie, sér. B.: Sci. Nat., 1912, pp. 189–335.)

Scott, D. H.—On *Botrychioxylon paradoxum*, sp. nov., a Palaeozoic Fern with Secondary Wood. (Trans. Linn. Soc., 2 ser., vol. vii., pp. 373–389, tt. 37–41.)

Yapp, R. H.—*Spiraea Ulmaria*, L., and its Bearing on the Problem of Xeromorphy in Marsh Plants. (Ann. Bot., vol. xxvi., pp. 815–870, tt. 81–83, with eleven figs. in text.)

Mr. L. A. Boodle continued an examination of the structure of the seeds of an Aroid, and studied the anatomy of some Dicotyledonous plants in relation to their affinities, and of some fasciated and other anomalous specimens.

Miss J. J. Clark examined the structure of some abnormal flowers of *Amelanchier* showing staminoid petals: see above.

Dr. J. V. Eyre investigated several species of *Linum* in relation to the presence of certain glucosides and enzymes.

Dr. J. A. Samuels carried on a developmental and cytological investigation of the ovule and embryo-sac in some species of *Araceae*.

Mr. A. Sharples began a research on a fungal disease of species of *Rhododendron*.

Prof. R. W. Smith examined the ovule and gametophytes of *Cedrus*, and the ovules of some other conifers.

Mr. J. M. Thompson studied the flowers of a number of Dicotyledons with regard to floral zygomorphy.

Pathology.—The quantity of material submitted to Kew for examination during the past year has been much in excess of previous years. No parasite, not previously recorded, has been noted as causing injury to any serious extent. The disease of raspberry and loganberry canes, caused by *Hendersonia rubi*, appears to be extending its area, many examples from widely separated localities having been received during the year.

The frequent occurrence of tubers on the above-ground parts of potato haulms has been very marked. This subject has been dealt with in the Journal of the Board of Agriculture.

Ophiobolus graminis, a fungus causing "blindness" in the ears of wheat and oats, is apparently on the increase, and has been investigated.

The presence of mould on pork received from China has been examined.

Pathological material has been received from the Federated Malay States, New Zealand, Nigeria, Uganda, West Indies, &c.

Additions to the Herbarium during 1912.—During the year about 32,000 specimens were received as donations or exchanges, while about 5,000 were purchased. The principal collections are enumerated below.

EUROPE. *Presented*:—Cryptogamae Exsiccatae, Cent. xx., by Dr. A. Zahlbruckner; Fungi, by Dr. G. Bresadola.

Purchased:—H. Sudre, Herbarium Hieraciorum, fasc. 1; Fiori and Béguinot, Flora Italica Exsiccata, fasc. 15–16; A. Kneucker, Cyperaceae et Juncaceae Exsiccatae, Liefr. 8–9 (including extra-European specimens); F. Körnicke, Cereals; H. Dahlstedt, Taraxaca Scandinavica Exsiccata, fasc. 2; P. Sydow, Mycotheca Germanica, fasc. 22–23; J. Serebrianikow, Mycotheca Rossica, fasc. 6–7.

ORIENT. *Purchased*:—J. Bornmüller, Syria.

NORTHERN ASIA. *Purchased*:—Miss A. M. Creswell, Kashgar.

CHINA. *Presented*:—Père G. Giraldi and Père C. Silvestri, by Dr. R. Pampanini; Dr. J. M. Dalziel, by the Regius Keeper, Royal Botanic Garden, Edinburgh.

Purchased:—Prof. C. S. Sargent, E. H. Wilson's Chinese plants.

INDIA AND MALAYA. *Presented*:—Kashmir, by Mr. G. L. de la C. Fuller; Punjab, etc., by Mr. J. R. Drummond; Kachin, by Capt. S. M. Toppin; Burma, by Mr. J. H. Lace and Mr. W. A. Robertson; Siam, by Dr. A. F. G. Kerr, Mr. W. F. Lloyd, Mr. H. B. G. Garrett and Luang Vanpruk; Malay Peninsula, by the Superintendent, Royal Botanic Gardens, Calcutta, Mr. J. S. Gamble and Mr. J. W. Anderson; British North Borneo, by Miss L. S. Gibbs; Celebes, by Dr. R. Schlechter; New Guinea, by the Director, Rijks Herbarium, Leiden; Philippine Islands, by Mr. E. D. Merrill; Malay Archipelago, by the Director of the Botanic Garden, Buitenzorg; Malay Fungi, by Dr. G. Bresadola.

Purchased:—A. D. E. Elmer and C. M. Weber, Philippine Islands.

AUSTRALASIA. *Presented*:—Australia, by the Director, Botanic Gardens, Sydney; Queensland, by the Colonial Botanist, Brisbane; New Zealand, by Mr. T. F. Cheeseman and Miss L. S. Gibbs; Fiji, by Miss L. S. Gibbs.

TROPICAL AFRICA. *Presented*:—Sierre Leone, by Mr. C. E. Lane-Poole; Gold Coast, by Mr. T. F. Chipp; Northern Nigeria, by Mr. C. C. Yates; Southern Nigeria, by Mr. and Mrs. P. A. Talbot, Mr. N. W. Thomas, and the British Museum (Natural History); Somaliland, by Dr. R. E. Drake-Brockman; Uganda, by Miss M. H. Mason; Katanga, by Mr. H. A. Homblé, through Mr. J. Burtt-Davy; British East Africa, by Mr. E. Battiscombe; Portuguese Nyasaland, by Mr. C. E. F. Allen; Percy Sladen Memorial Expedition collections, by the Percy Sladen Memorial Trustees, through Prof. H. H. W. Pearson and the Curator of the Bolus Herbarium.

Purchased:—G. Zenker, Cameroons, through Prof. E. Gilg; Rev. F. A. Rogers, Rhodesia.

MASCARENE ISLANDS. *Presented*:—Madagascar grasses, by the Hon. P. A. Methuen, through Prof. H. H. W. Pearson, and by Mr. E. Perrier de la Bâthie, through Prof. H. Jumelle.

South Africa. *Presented*:—Various collections by the late Dr. H. Bolus, through Mrs. F. Bolus, and by Dr. R. Schlechter, through Dr. Hans Schinz; Giftberg, by Mr. E. P. Phillips, through Prof. H. H. W. Pearson; Transvaal, by Mr. J. Burtt Davy; Pondoland, by Miss M. H. Mason; Natal, by Mr. J. Medley Wood.

Purchased:—W. Barron, specimens of Erica.

North America. *Presented*:—Various specimens, by Prof. C. S. Sargent; by Mr. J. B. Leiberg, through the Smithsonian Institution; grasses, by the United States Department of Agriculture; California, by Prof. W. A. Setchell.

Purchased:—F. S. Collins, Phycotheca Boreali-Americana, fasc. 36–37; Prof. J. Macoun, Canadian Mosses, Hepaticae and Lichens.

West Indies. *Presented*:—Cuba, Jamaica, etc., by Dr. N. L. Britton; Tobago, Trinidad, etc., by Mr. W. E. Broadway.

South America. *Presented*:—Brazilian Malpighiaceae, by L. Riedel, through the Director, Imperial Botanic Garden, St. Petersburg; Herbarium of the late E. F. André, by the Bentham Trustees; Falkland Islands, by Mrs. E. Vallentin.

Purchased:—Dr. Otto Buchtien, Herbarium Bolivianum, Cent. i.

The largest contribution during the year was the herbarium of the late Edouard François André, which contains 14,000 sheets and was presented by the Bentham Trustees. Most of the specimens were collected by André in Colombia. Dr. A. F. G. Kerr has sent additional specimens from Doi Sootep, Siam, as well as those collected on a tour eastwards to Nan, whence he proceeded north-west to Chiengrai, returning southwards to his headquarters at Chiengmai. He has also sent a collection from Sriracha on the south coast of Siam. Large collections from Old Calabar have been received from Mr. and Mrs. P. A. Talbot, and from Asaba and vicinity (Southern Nigeria) from Mr. N. W. Thomas, Government Anthropologist. Mr. T. F. Chipp has sent an interesting collection from the Gold Coast. The Percy Sladen Memorial Trustees have presented collections made during the expeditions in South-West Africa under their patronage by Prof. H. H. W. Pearson and others. Dr. N. L. Britton has communicated collections made by him during his recent visit to Cuba, as well as specimens from other West Indian islands. Mrs. Elinor Vallentin has presented the large collection (including many cryptogams), which she made during her residence in the Falkland Islands, 1909–1911. Mr. Alwyn Berger has sent at various times fresh specimens of plants flowering at La Mortola. More than 7000 specimens have been received on loan for working up the African floras and for research on special groups.

Presentations to the Library during 1912.—The collection of Herbals at Kew, now a considerable one, has been augmented during the year by numerous purchases made on behalf of the establishment by the Bentham Trustees, who have presented most of the works of this class added to the library in the course of the last twenty years. Among the more interesting and valuable of those received from them in 1912 is an excellent copy of the *New Kreuterbuch* (Basel, 1543), by Leonhard Fuchs. This is a German edition of *De historia stirpium commentarii insignes* (1542),

a work rivalling the best of the Valgrisian editions of Mattioli's *Commentarii* in the fine woodcuts of plants for which it is remarkable. These woodcuts are the same in the two editions.

Six editions of Mattioli's works have been presented by the Bentham Trustees. These include the rare first Italian edition, published in Venice in 1544, which is the earliest work attributed to Mattioli. This lacks the figures of plants which are present in varying numbers and sizes in all the other editions at Kew, and it further differs in being furnished with small woodcut initials to the chapters, there being in some instances as many as six or eight on one page. The 1581 Italian edition has also been acquired, as well as the Latin editions (Valgrisian) of 1560 and 1570. It is recorded that it was to the 1560 Latin edition that Gerard and Parkinson were especially indebted.

The first Bohemian edition of Mattioli's Herbal (by Mattioli and Hagecius ab Hagek), published in Prague in 1562, is a rare work and has been described as "the finest Herbal in existence." It contains the large woodcuts characteristic of the best Valgrisian editions and is the earliest of Mattioli's works at Kew in which these large woodcuts are present. They differ markedly from those of Leonhard Fuchs' work referred to above in being heavily shaded. A good copy, in contemporary stamped pigskin, is among the presentations by the Bentham Trustees. The establishment is also indebted to them for a well-preserved copy of the 1517 Latin edition of the *Ortus Sanitatis*; Brunfels, *Contrafayt Kreuterbuch*, Strasburg, 1532; Dodoens, *A New Herball*, London, 1595; Lobel, *Plantarum seu Stirpium icones*, Antwerp, 1581 (first edition); Petrus de Crescentiis, *Opera di Agricoltura*, Venice, 1534; Pliny, *Historia naturalis libri xxxvii*, Venice, 1513, antedating any other edition at Kew by nearly a century. Porto, *Phytognomonica*, Naples, 1588 (first edition); also a copy, not quite complete, of the *Histoire de la Navigation de Jean Hugues de Linscot* (Linschoten), Amsterdam, 1610; two copies of the sixth volume of Elwes and Henry's *Trees of Great Britain, and Ireland; Nova Acta Academiae C.L.C. Germanicae Naturae Curiosorum*, vols. 90 to 95, in continuation; and the issues for the year of about thirty periodical or serial publications, received in exchange for *Hooker's Icones Plantarum*.

The library now possesses the interesting series of original sketches made by Sir J. D. Hooker during his Indian travels, some of which have been reproduced in his *Himalayan Journals*. They have been laid down in a large folio volume, which, according to a wish expressed in Sir Joseph's will, has been sent to Kew by his executors, from whom has also been received another large folio volume containing the great botanist's numerous diplomas.

From the Royal University of Upsala a number of books and pamphlets on Swedish botany has been received, including: N. C. Kindberg's *Svensk Flora*, 1877; *Schwedische Reise in den Jahren 1765-1766*, by J. Beckmann, edited by Th. M. Fries, 1911; and *Schedulae ad S. J. Enandri Salices Scandinaviae exsiccatas*, fasc. 1–3, 1910–11.

Sir Frank Crisp, Bart., has presented the *Illustrations of Conifers* by H. Clinton Baker, 1909, a valuable work of which two

volumes have so far appeared; also Timiriazeff's *The Life of the Plant*, translated by A. Chéréméteff, 1912, and the English edition of *The Alpine Flora*, by H. Correvon and P. Robert [1912]. The original edition of the last named was presented by Sir Frank in 1909.

From the Secretary of State for India another volume of Mr. W. Foster's work *The English Factories in India*, dealing with the period between 1637 and 1641, and a further portion of *The Bower Manuscript* have been received.

The *Actes du IIIme Congrès International de Botanique* (Brussels, 1910) were published last year in two volumes under the direction of Dr. E. De Wildeman, by whom they have been sent to the library.

Dr. S. H. Koorders has contributed a set of his *Exkursionsflora von Java*, published by G. Fischer of Jena, 1911–12. Though the descriptive matter is arranged mainly in the form of keys, the work forms three large octavo volumes, comprising altogether nearly 1700 pages, with 17 plates, 4 maps, and 139 text-figures. It impresses us as being most carefully done, and we welcome it as a valuable guide to a rich and interesting flora.

Prof. Hans Schinz has continued to send the *Mitteilungen aus dem botanischen Museum der Universität Zürich.* Among those received in 1912 are: *Die Algenflora der Limmat vom Zürichsee bis unterhalb des Wasserwerkes*, by H. Limanowska, 1911; *Deutsch-Südwest-Afrika, in botanischer Beziehung*, 1, by H. Schinz, 1911; and further *Beiträge zur Kenntnis der afrikanischer Flora und der Schweizerflora*, edited by H. Schinz.

Mr. W. Botting Hemsley has presented a set (250) of the plates prepared for Mr. T. F. Cheeseman's forthcoming work, *Illustrations of the Flora of New Zealand.* The plates have been drawn under the direction of Mr. Hemsley by Miss M. Smith and lithographed by Mr. J. N. Fitch.

The second edition of Mr. Arthur Lister's fine *Monograph of the Mycetozoa*, revised by Miss Gulielma Lister, 1911, has been received from the Trustees of the British Museum.

Mr. J. H. Maiden's *Critical Revision of the genus Eucalyptus* has now reached part 16. Parts 14 to 16 have reached the library during the year from the author, and the continuation of his *Forest Flora of New South Wales* (four parts) has been received from the Honourable the Secretary for Agriculture, Sydney.

Mr. Zygmunt Wóycicki of Warsaw has begun a work illustrating the vegetation of Poland, following the plan of the well-known *Vegetationsbilder* of Karsten and Schenck. It is entitled: *Obrazy Róslinnosci Królestwa Polskiego.* Three parts, each containing ten plates, with descriptive text in Polish and German, have so far been issued, and for these the establishment is indebted to the author.

An interesting manuscript has been presented by Canon Ellacombe. It is a transcript of the account of Samuel Brewer's journey from Yorkshire to London in 1691. It bears the title *Adversariorum Hodoeporicum*, and on a fly-leaf it is stated that "the original is in the possession of Miss Currer at Eshton Hall." Brewer, who was the first to discover *Dianthus caesius* in Britain,

visited the Chelsea Physic Garden which he described as "a pretty collection but not such as many boast it to be."

John Smith, Curator of the Royal Botanic Gardens, Kew, from 1841 to 1864, evidently contemplated a much more comprehensive history of the establishment than that afforded by his *Records*, for the library has received from Dr. J. H. Wilson, of the University of St. Andrews, a thick volume, foolscap-folio size, containing manuscript and printed matter relating to the gardens, and lettered on the back: "History of the Royal Gardens Kew by John Smith."

Among the other presentations to the library may be mentioned *Hortus Mortolensis*, by A. Berger, received from Lady Hanbury; *Icones of the Bamboos of Japan*, and *Illustrations of Japanese Fungi*, from the Bureau of Forestry, Tokyo; *Plantae Wilsonianae*, edited by Prof. C. S. Sargent, part II, from the editor; *North American Flora*, published by the New York Botanical Garden, vol. vii. part 3, and vol. xvii. part 2, from Dr. N. L. Britton; *Icones Plantarum Koisikavenses*, vol. i. nos. 1–3, from the editor, Prof. J. Matsumura, who has also sent the final part (vol. ii. part 2) of his *Index Plantarum Japonicarum;* nos. 54–61 of the *Journal of the Straits Branch of the Royal Asiatic Society*, from the Secretary; *Les plus belles Roses au début du xxe siècle*, received from the Section des Roses de la Société Nationale d'Horticulture de France through the President, Mr. M. L. de Vilmorin; a copy of Lindley's *Genera and Species of Orchidaceous Plants*, once the property of C. L. Blume, from Sir Everand im Thurn, K.C.M.G.; and a set of his numerous papers from Mr. H. N. Ridley.

The titles of works presented by their authors, among whom should be specially mentioned Mr. J. E. Anderson, Dr. L. Capitaine, Mr. J. Cardoso, Junr., Mr. R. W. T. Günther, Dr. B. Hayata, Mr. U. P. Hedrick, Dr. T. Nakai, Mr. W. A. Talbot and Dr. F. Tobler, will be included in the next supplement to the library catalogue which will form Appendix 2 to the *Kew Bulletin*, 1913.

Botanical Magazine for January.—The plants figured are *Senecio stenocephalus*, Maxim. (t. 8472); *Rosa sertata*, Rolfe (t. 8473); *Clerodendron Bakeri*, Gürke (t. 8474); *Amorphophallus corrugatus*, N. E. Brown (t. 8475); and *Aster Purdomii*, Hutchinson (t. 8476).

The *Senecio* is a handsome species belonging to the section *Ligularia*, and has very large cordate leaves and yellow flower-heads, arranged in a raceme, which is sometimes 14 inches long. It is distinguished from *S. Ligularia*, Hook. f. by the long and narrow bracts which subtend the peduncle, and by the narrower few-flowered heads. The species is a native of Japan and Northern China, and the specimen figured was communicated by Messrs. J. Veitch & Sons, who have raised plants from seeds collected in the latter region by Mr. W. Purdom.

Rosa sertata is a pretty new species which Messrs. Veitch have introduced from China and presented to the Kew collection. It is closely allied to *R. Webbiana*, Wall., differing in a laxer habit, more slender prickles, longer leaves and narrower fruits, and proves to be identical with two plants received as this species from

Messrs. Vilmorin, Andrieux & Co., and with another, raised from seed collected by Mr. A. Henry, which the late Prof. Crépin thought might be a small-leaved form of *R. macrophylla*, Lindl. It is larger in all its parts than *R. Willmottiae*, figured at t. 8186. The Kew plant of *R. sertata* flowered in June, 1910.

Clerodendron Bakeri is a handsome shrub attaining a height of about four feet, with large oblong or oblong-elliptic leaves, and showy heads of white fragrant flowers. It is a native of West Tropical Africa, occurring in the region of the Lower Congo and in Sierra Leone. The figure has been prepared from material obtained from a plant presented to Kew in 1910 by Captain Munro, R.N., of Woodlands, Binfield.

Amorphophallus corrugatus has recently been described for the first time from specimens collected by Dr. A. F. G. Kerr in the evergreen forest on the Doi Scotep mountain, in the district of Chiengmai, Siam. In addition to sending herbarium material to Kew, Dr. Kerr forwarded living tubers to the Botanic Garden of Trinity College, Dublin, where one flowered in April, 1912, and supplied the specimen figured. The species is easily distinguished from its nearer allies by the spathe being open in front almost to the base, by the curiously corrugated appendix, and by the purple ovaries.

Aster Purdomii is a new species which Messrs. Veitch have introduced, through their collector Mr. W. Purdom, from the province of Shensi, Northern China, and which flowered at Coombe Wood in May, 1912. In habit it resembles *A. alpinus*, Linn., but it may be distinguished from this and all the other Asiatic species by the distinctly stalked ovate or ovate-elliptic radical leaves, with two or three small teeth, associated with almost leafless stems and solitary flower heads. It promises to be a useful plant for the rock garden.

Echinocactus ornatus.—We are indebted to Mr. F. de Laet of Contich for drawing our attention to the fact that the plant figured as *E. ornatus* on the plate in *K.B.*, 1912, facing p. 300, is really *E. myriostigma*. In the true *E. ornatus* the spines with which the plant is armed are ¾ in. long, and such spines are entirely absent in *E. myriostigma*, the plant figured.

The plant had been obtained under the name *E. ornatus*, and the identification had not been verified at the time of the publication of the figure.

N. E. B.

Entandrophragma.—The timber of several species of *Entandrophragma* is shipped from West Africa under the trade name of Cedar. In view of the commercial importance of the genus, it has seemed desirable to draw up the following key to the species represented in the Kew Herbarium. *E. excelsum* has been omitted on account of the inadequate nature of the material. The synonymy and geographical distribution of the species have been given in *Kew Bull.*, 1910, pp. 179–181. Since that account was established three additional species have been described: *E. Rederi*, Harms in Notizbl. Bot. Gart. Berlin, vol. v. p. 184 (Cameroons); *E. speciosum*, Harms in Wiss. Ergebn. Deutsch. Zentral-Afr.-Exped.

1907–1908, vol. ii. p. 429 (Kwidjwi Island, Lake Kiwu); and *E. choriandrum*, Harms, l.c. 430 (Belgian Congo). None of these is represented at Kew. *E. Casimirianum*, De Wild. & Th. Dur., Ill. Fl. Congo, p. 126, is an alternative name for *E. Candolleanum*, De Wild. & Th. Dur.

Leaflets caudate ... ... *E. caudatum.*
Leaflets not caudate :—
Petiole much flattened at base; leaflets 6–9 pairs, firmly coriaceous, margins undulate; lateral nerves very prominent on the lower surface.
Leaflets obovate-oblong, distinctly cuspidate ... ... *E. Candollei.*
Leaflets oblong or elliptic-oblong, not cuspidate ... ... *E. ferrugineum.*
Above characters not combined :—
Leaflets cucullate-cuspidate :
Leaflets obovate to obovate-oblong ... ... *E. angolense.* / *E. macrophyllum.*
Leaflets elliptic to elliptic-oblong, cuspidate from an emarginate apex ... ... *E. septentrionale.*
Leaflets shortly acuminate :—
Leaflets glabrous; capsule cylindric ... ... *E. cylindricum.*
Leaflets with tufts of hairs in the axils of the nerves; capsule massively club-shaped ... *E. utile.*

T. A. S. and T. F. C.

Agricultural Department, Dominica.—The Report of the Dominica Agricultural Department for the year ending March 31st, 1912, is more than usually interesting, and is illustrated by some useful photographs taken in the Gardens.

Of introduced trees which have fruited for the first time may be mentioned the Durian and the Honduras Mahogany (*Swietinia macrophylla*). Teak grows well and seeds freely, and the African Mahogany *Khaya senegalensis* is found to thrive in a sheltered position.

The Lime industry in the island continues to flourish, and an additional acre of land has had to be added to the nurseries to provide room for meeting the largely increased demand for lime plants.

Trials with several Leguminous plants as green dressings were made, and *Tephrosia candida* gave very satisfactory results. It is recommended as being especially useful for rubber plantations since it keeps the soil clean from weeds.

Grafted Cacao is again reported on favourably, and good photographs of budded Cacao, taken six weeks after budding, are reproduced.

The Report also includes an interesting account of the efforts that are being made in the island to improve the Cacao cultivation among the peasant proprietors by visiting instructors.